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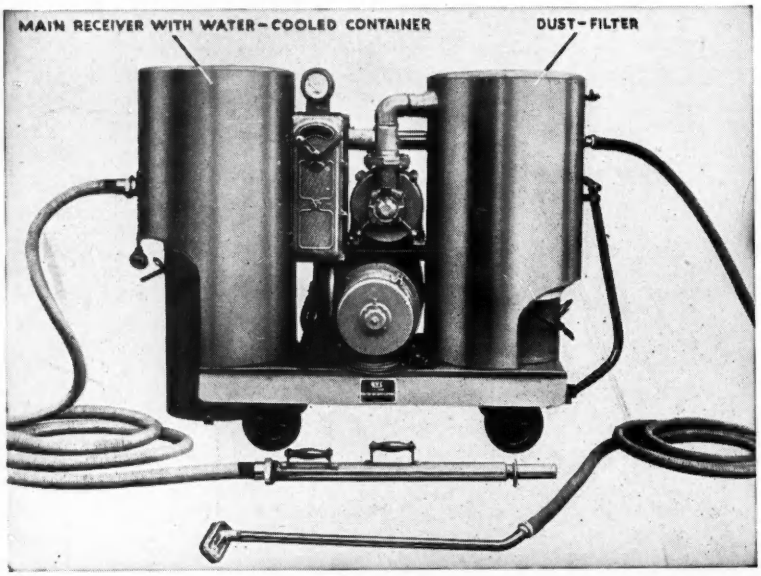

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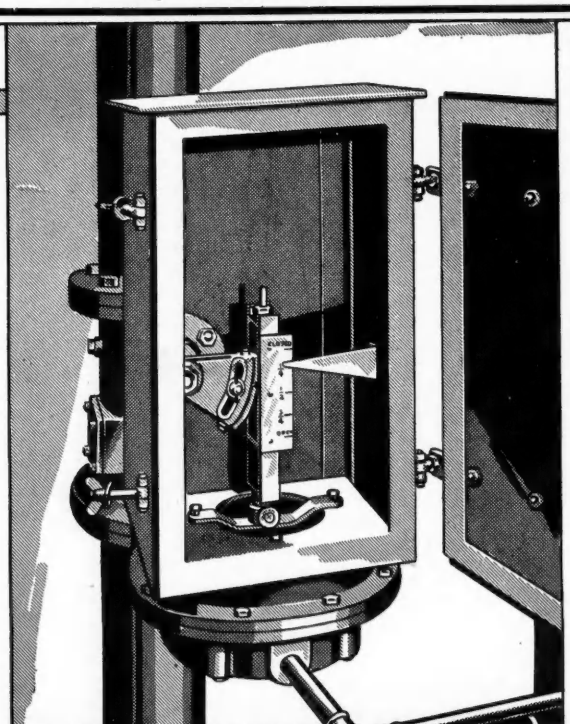


The BRYAN DONKIN Co LTD.
CHESTERFIELD

GAS JOURNAL

Vol. 255 September 22, 1948 No. 4451

THE IRISH ASSOCIATION

THE gas industry in Ireland had no easy time during the war years. Coal supplies were a major difficulty ; with lack of materials maintenance of gas-making plant was a constant source of worry, and most of the troubles of ensuring a supply of gas, however restricted, needed the exercise of much ingenuity. If not altogether surprising, it is certainly praiseworthy how well the Irish gas industry as a whole, and individual undertakings, dealt with general and specific problems. Individual undertakings, in the majority small and remote from one another, lived and strived—and for the most part won through—during a time when the industry as such was isolated. The gravity and the peculiar nature of the difficulties were made manifest at the annual meeting of the Irish Gas Association in Cork last week—the first to be held since 1939, when the venue was Dublin. Members of the Association during this long period when meetings could not be arranged practically must have greatly missed the chances of discussing their problems with one another, and must have missed, too, the encouraging and broadening social stimulus which was such a feature of pre-war gatherings, and which, indeed, was an outstanding feature of the first post-war meeting of the Association last week.

The meeting, under the Presidency of Mr. P. J. Sheehan, Engineer and Manager of the Cork Gas-Works, was in every respect, a success. The attendance was good, the technical fare was of high standard, Mr. Sheehan's Address was packed with thought, and throughout the characteristic spirit of freedom and good fellowship prevailed. All through the meeting the weather was kindness itself, and the clouds of possible further world conflict were dissipated at any rate temporarily by good cheer, high spirits, and a hopeful outlook on the expansion of the gas industry. There is much work to be done ; that is obvious. Recovery may not be as swift as could be desired. But the potentialities of the gas industry in Ireland are fully appreciated by those within the industry whose task it primarily is to translate these potentialities into practical form. Our report on later pages adequately conveys the atmosphere of the meeting. It was a meeting admirably led by Mr. Sheehan at which tribute to the industry's endeavours was voiced in the happiest vein by many whom the industry sets out to serve ; at which the discussion on the two papers presented—one by Mr. H. C. Harrison, of Dublin, on mechanical handling, the other by Mr. J. J. O'Mahony, of Cork, on pressure distribution—were commendably spontaneous ; and at which the determination to effect reconstruction on modern lines and make up for enforced lost time as speedily as possible was a keynote. In all this work the contracting firms of the gas industry in Great Britain have a large part to play. They are fully equipped to play this part to the advantage of Irish gas consumers ; and it is fortunate that within the ranks of the Irish Gas Association the co-operation between the supplier of gas and the manufacturer of gas-making and gas-using plant and equipment is so close.

As we have indicated, the two papers gave rise to good discussions. To these and also to the President's Address we hope to refer in more detail in a subsequent issue. It seemed to us that there is a bigger labour force available to Irish gas undertakings than prevails in England and Wales or Scotland, a labour force, moreover, if more temperamental, of a more robust type. Available food supplies of the right variety must, of course, have a considerable bearing on this. At the same time it was good to listen to Mr. Harrison's paper, delivered by the author in most convincing style, and to learn of the emphasis placed by the Alliance and Dublin Consumers' Gas Company on mechanization. Mr. Harrison spoke of mechanization generally, but the major note of his contribution concerned the all-round merits of bulldozers and angledozers, and he showed himself an ardent advocate of the use of both. His advocacy, of course, must be tempered by the size of gas-works concerned, and there are only three large works—using the term "large" elastically—in Ireland. These are Belfast, Dublin, and Cork, in that order. The paper by Mr. O'Mahony described in brief outline the "high pressure" gas distribution scheme at Cork. We have quoted "high pressure" purposely because the scheme, which is in its infancy, works on a pressure of only 2 lb. per sq. in. for three hours a day, and 2 lb. per sq. in. is not high pressure, though each of the compressors (they are in duplicate, one steam driven, the other electrically driven) has a rating of 200,000 cu.ft. per hour at 20 lb. per sq. in. Under present working conditions "the whole scheme is working perfectly, the results being all that were anticipated, and ample provision has been made to cope with the increased loads which are expected."

We have given an impression of a successful meeting, but we have a final note. Its success was largely attributable to the preparatory work put in by the Association Secretary, Mr. W. Cole. It must have been a great disappointment to him that, through indisposition, he was unable to attend and witness the outcome of his efforts.

PUBLIC LIGHTING

FIGURATIVELY as well as factually public lighting is at the cross roads. With the electricity industry already nationalized, the gas industry on the verge of nationalization, and the trend towards fewer and larger administrative units, many changes have been made or are impending, in which the Association of Public Lighting Engineers, whose annual meeting at Eastbourne last week is reported in later pages, is destined to play a not unimportant part. The importance of good public lighting is being realized and is the active interest of civic representatives, manufacturers, lighting specialists, gas and electrical engineers, surveyors and officers of Government departments, many of whom are members of the A.P.L.E. The new British Electricity Authority and the Area Electricity Boards are alive to the importance of the subject and have added their representative quota of delegates to the Association's conference, and the same thing will apply to members of the gas industry in its future form.

The A.P.L.E. attains its Silver Jubilee next year. Although it is still young enough to have some of its founders still attending its meetings—notably, Captain W. J. Liberty, its first Secretary, and Mr. Thomas Wilkie, of Leicester, who has just completed his second term of office as President—it is old enough to be able to contrast the haphazard state of public lighting in 1924 with the high efficiency of the lighting of to-day, which in the case of many miles of motoring roads and shopping streets is of a standard never dreamed of in 1924, while thousands of side roads are better lighted than the main roads of that period. In extending a civic welcome to the Association, the Mayor of Eastbourne rightly recalled that much progress had been achieved as the result of healthy competition between the gas and electricity industries; that each had vied with the other to produce the most efficient and effective form of street lighting, and he wondered whether, in the nationalized future, we might not lose some of the incentive of the past.

It would appear that no matter how highly centralized the control of public lighting may become in the future there must always be a considerable measure of local administration to meet local circumstances. As matters stand at the moment, it seems that those electrical engineers who have had charge of public lighting in the past still discharge those duties quite apart from their responsibilities, under familiar titles, as officers of the nationalized electricity industry, and in the same way local gas engineers charged with like duties will, we imagine, continue to carry them out under the new set up. We heard at Eastbourne of thousands of gas lamps having been superseded by electric, and of more thousands of electric lamps being installed in newly opened thoroughfares. It cannot be denied that the proportions have altered substantially in recent years, and the gas industry can no longer claim a monopoly to the extent it could when the A.P.L.E. was founded, but the number of gas engineers present at the conference, and the very good show put up in the lighting equipment exhibition by the manufacturers of gas appliances proved that, within fairly clearly defined limits, gas still has, and will have for a long time to come, a worthy contribution to make to a brighter Britain.

In the past year the A.P.L.E. has suffered heavily by the death of its Secretary, Mr. H. O. Davies, a past Secretary, Mr. J. S. Dow, a past President, Mr. A. Forbes, and an Hon. Member, Sir Clifford Patterson. Mr. Eric Evans, who served under Mr. Davies for many years, has become Secretary; that the distinction was merited was proved by his handling of the arrangements for the Eastbourne meeting. Mr. N. Boydell, Eastbourne's Borough Electrical Engineer under a new nationalized title, has been installed in the Presidential chair, and the new Vice-President is Mr. A. S. Tapsfield, City of London Public Lighting Inspector, who fills an office occupied many years ago by Captain Liberty.

GAS IN AUSTRALIA

Alarm at the position of coal supplies in Australia, affecting not only gas but every other industry in the country, is expressed by the Managing Director in *The C.G.A. Service Messenger*, the quarterly magazine published by the Colonial Gas Association of Melbourne.

"At the time of writing," the magazine says, "the position of coal supplies in Australia was never worse, and one wonders just how long the general public will submit to the current tyranny of a handful of people engaged in what is called a 'key industry,' and which because of that is peculiarly susceptible of exploitation." This refers to a strike of railway workers which the magazine blames on the unions and says is a "Communist design to discredit the present economic system of the country." Supplies of coal must be kept up if an uninterrupted service is to be given by the gas industry, the article says, and the hand-to-mouth basis of coal supply, with the necessity of rationing that is periodically imposed upon householders and on industrial and commercial consumers of gas must inevitably react unfavourably on the entire gas industry. It expresses a fear that the gas industry in Australia might be put out of business.

The seriousness of the position is made clear by the writer when he says that Australia is a young country crying out for development which yet "slips further behind." "The unions must go on," it states, "but their best work will be achieved in the field of genuinely raising living standards *outside* the acrimonious atmosphere of political agitation."

Meanwhile, the same magazine records a more hopeful state of things in a review of present gas consumption in Australia. In Wangaratta, for instance, gas sold has risen from 6.4 mill. cu.ft. in the year ending June, 1939, to 21 mill. cu.ft. in the year ending June, 1948. In Queensland, 92,336 homes are now supplied with gas.

A PERMANENT SHORTAGE

Continuing exhortations to the miners to produce more must not mislead anyone into thinking that Great Britain can look forward to an eventual halcyon period of plentiful fuel supplies. The pre-war era has gone for ever. This has become clear from statements made by a representative of the Ministry of Fuel and Power and by Mr. E. Crowther, President of the Institution of Gas Engineers, at recent meetings. Britain's future fuel policy is to cater for a country with a permanent shortage.

At a meeting of the National Association of Gas Coke Federations at Gas Industry House on Sept. 7, Mr. J. Price-Walters, of the Ministry of Fuel and Power, said that the fuel position in England was the same as in France—we had not enough and were not likely to have enough. He was commenting on statements made by a representative of the Centre Technique des Industries de la Fonderie, M. Georges Ulmer, who had stated that France's coal resources are poor and that consequently she had to design appliances to use every scrap that was available. Mr. Price-Walters said that the position here was similar, not because our resources were poor but because our economic situation meant that we could not devote what we had to the home market. Exports had first priority.

That the gas industry is alive to the problems implied in this statement was indicated by the President of the Institution when he spoke at the Presidential meeting of the Eastern Junior Gas Association at Peterborough on Sept. 15. Mr. Crowther echoed the remarks of Mr. Price-Walters when he said that it was necessary to face an entirely different conception of fuel in this country in the future than we had been accustomed to in the past. Until 1918, Mr. Crowther said, nobody bothered about the cost of fuel; supplies had always been abundant, sometimes more abundant than the market called for, and prices were not high. He did not think that those days would come back again. Not only were supplies restricted to-day in comparison with needs but prices had risen to a level at which they would stay, even if they did not further advance. For these reasons we had to redouble our efforts towards fuel economy. Mr. Crowther was just back from Switzerland where, he said, he had been struck to see the enormous importance attached to saving the last little bit of fuel. He felt that Britain would have to move in a similar direction.

Though it is unpleasant to have to realize that Britain, with all her mineral wealth, should have to think on lines of such a degree of economy, it is satisfying to know that the gas industry is alive to the problem. There seems to be plenty of scope in this direction in learning from countries like France and Switzerland which have long had the same difficulty: this is a point that was brought out at the Coke Association's meeting. There seems too to be a great opportunity for the gas industry to show what it can do in aiding other industries whose use of fuel is not so economical as its own.

LONDON'S RIVER TRAFFIC

The River Thames carries an abundance of craft, large, small, but seldom indifferent. Vessels bring to Greater London cargoes essential to the work, comfort, and home life of thousands, ranging from liners entering London's docks to the smaller, but equally important craft which navigate the Thames above the Pool. Many of these are seagoing ships, specially designed to negotiate the 17 bridges that span the river between the Tower and Wandsworth; to this number belong the colliers—or "flat irons" as they have been dubbed by river folk—which form the link between the coalfields and London's vast system of gas and electricity production. Throughout the war and during the years that followed that link remained unbroken. Its continuance was due to many factors—courage, seamanship, resourcefulness on the part of the owners of these craft—and also to the work of a body representing the users of the river highway. The formation of the Thames River Users' Association more than 20 years ago coincided with the appointment of a Royal Commission on Cross-River Traffic in London. The Commissioners were instructed to survey the whole problem of cross-river traffic; to report on what provision should be made to meet future requirements, and, in particular, to consider the proposals made in connexion with Waterloo and St. Paul's bridges. The Association, which was registered in March, 1927, answered the preliminary questionnaires on navigational matters,

issued by the Royal Commission and evidence was given before that body in September, 1926. Before the end of the year, the Commissioners had submitted their report containing many important clauses that could be directly traced to the new Association's work; certain of these recommendations really constituted a charter for the building of new bridges. The report of the Commission stated: "The river traffic above London Bridge is continually expanding and, owing to the facilities offered for easy access to provincial centres by road and rail, up-river wharves are being used more and more as distributing depots. Recent years have witnessed the erection of a large number of new wharves, factories, and works as far up the river as Brentford. . . . We are informed by the Port of London Authority that, at the present time, there are about 1,155 wharves and jetties of all descriptions within the Port of London, which extends from the Nore to Teddington. Of these, about 350 are within the area between London Bridge and Kew. There is, consequently, reason to expect that there will be a progressive increase in all kinds of river traffic, due to the growth of population and trade in the outer districts of London." That expectation has been amply fulfilled, and, apart from numbers vessels now use the river as far up as Wandsworth that have only a few feet to spare on either bank when they turn. The ships have limited headroom when they pass under Westminster Bridge, now the lowest of mid-Thames bridges. The 1926 Commissioners referred to barge traffic as the main feature of the River Thames and gave the tonnage registered with the P.L.A. as 540,404; there has been an increase of 10,000 tons in five years. Since that time the Thames River Users' Association has steadily progressed. It had an influence on the design of the new Waterloo Bridge, it concerned itself with the Middlesex County Council's proposed Bill dealing with Chiswick and Richmond bridges, it co-operated with the P.L.A. on the demolition of old Lambeth Bridge, and the plans for Charing Cross Bridge and the widening of Putney Bridge, it helped with the reconstruction of Chelsea Bridge, and many other matters. Air raid precautions and emergency water supplies exercised the Association's attentions in 1939 and the sites of three emergency bridges were under consideration in March, 1940. Thus it will be seen that the Thames River Users' Association is in no small way responsible for the regular supplies of coal needed by the gas industry and it is significant that its present Executive Committee includes Mr. F. M. Birks, Deputy Governor, and Mr. L. O. V. Hayward, Coal Officer of the Gas Light and Coke Company, and Mr. A. G. Gostelow, Shipping Manager of the Wandsworth and District Gas Company.

Personal

Mr. GEORGE BRAIDWOOD, Engineer and General Manager of the Coatbridge Gas Company, Lanarkshire, is retiring at the end of September, after 48 years in the gas industry. He will act for the Company as Consulting Engineer until the Area Board takes over, and will retain his seat on the Board of Directors.

* * *

Petrochemicals, Ltd., announces that Lieut.-General Sir W. G. LINDSELL, G.B.E., K.C.B., D.S.O., M.C., who has been a Director of the Company for the past two years, has been elected Chairman of the Board in place of Mr. H. STUART EBBEN. Mr. Ebben has been Chairman of Manchester Oil Refinery, Ltd., since its inception in 1938 and retains his seat on the Board of Petrochemicals, Ltd.

* * *

Mr. D. M. HOLLOWAY, B.Sc.(Lond.), has been appointed to the staff of Westminster Technical College, S.W.1, as Senior Lecturer in Gas Engineering. Mr. Holloway joins the College staff after some 13 years' experience of research and development work in the gas industry, first at Watson House and more recently as Superintendent of the Development Laboratories of the Parkinson Stove Company, Ltd.

* * *

The National Coal Board have appointed Mr. B. L. METCALF to be Chief Mechanical and Electrical Engineer in the Production Department at their London headquarters. Mr. Metcalf is at present Technical Director of the Brush Electrical Engineering Company, of Loughborough. At the N.C.B.'s urgent request his Company has agreed in the public interest to release Mr. Metcalf for service with the Board from Dec. 1.

The Liverpool and District Publicity Association is a newly formed body of which Mr. Stanley Hopkinson, Public Relations Officer of the Liverpool Gas Company, is Chairman. The Chairman of the Company, Colonel Albert Buckley, D.S.O., was a guest at the Association's formal luncheon in Liverpool on Sept. 10.

Diary

Sept. 24.—**North of England Gas Managers Association** (Auxiliary Section): Meeting at Sunderland and visit to Messrs. Alex. Pirie & Sons, Ltd.

Sept. 24.—**Institute of Fuel (Scottish Section)**: Annual General Meeting followed by D. M. Yuill, of Messrs. Wolsey, Ltd., on "Heat Conservation in a Dyeing and Finishing Works," 39, Elmbank Crescent, Glasgow, 6 p.m.

Sept. 27.—**Women's Gas Council**: Executive Committee, Gas Industry House, 1 p.m.

Sept. 28-30.—**Society of Chemical Industry**: Conference on Dust in Industry, University of Leeds.

Sept. 29.—**Institution of Heating and Ventilating Engineers**: "Research for the Heating, Ventilating and Air Conditioning Engineer," Cyril Tasker, M.I.H.V.E., Director of Research, American Society of Heating and Ventilating Engineers, at the Institution of Mechanical Engineers, Storey's Gate, S.W.1, 6 p.m.

Sept. 30.—**National Smoke Abatement Society**: Annual Conference.

Sept. 30.—**Severn Valley Gas Corporation Salesmen's Circle**: Visit to Ascot Gas Water Heaters, Ltd., Neasden.

Oct. 1.—**North of England Gas Managers Association**: Autumn General Meeting, Stockton-on-Tees. Presidential Address by F. L. Scaife. Visit to works of Ashmore, Benson, Pease & Co., Ltd.

Oct. 2.—**Scottish Junior Gas Association, Eastern District**: Opening Meeting, Falkirk. Presidential Address: W. Brown.

Oct. 5.—**Midland Junior Gas Association**: Opening Meeting. Presidential Address, C. L. Evans, Birmingham, 6.30 p.m.

Oct. 5.—**Wales and Monmouthshire Junior Gas Association**: Opening Meeting, Newport (Mon.). Presidential Address: M. A. H. Dyer. Visit to Factory and Area.

Oct. 8.—**Scottish Junior Gas Association (Western District)**: Presidential Address, L. Bain (Greenock), Glasgow.

Oct. 8.—**Manchester District Association of Gas Engineers**: Visit to Newton Chambers & Co., Ltd., Thorncliffe, near Sheffield.

Oct. 9.—**Manchester and District Junior Association of Gas Engineers**: Presidential Address, H. N. Dann (Blackburn); visit to Blackburn Corporation Gas Department, or to Philips (Blackburn), Ltd.

Oct. 12.—**Federation of Gas Employers**: Central Committee, Gas Industry House, 11.30 a.m.

Oct. 18.—**London and Counties Coke Association**: Annual Luncheon, 1 p.m. for 1.15 p.m.; Annual General Meeting, 2.45 p.m. Grosvenor House, Park Lane, W.1.

Oct. 19.—**Southern Association of Gas Engineers and Managers (Eastern District)**: Opening meeting, "The Future of Coke Marketing," J. O. Cooke, B.Sc., M.I.Mech.E., A.M.I.E.E., General Manager, London and Counties Coke Association, Gas Industry House, 2.30 p.m. Committee meeting, 11 a.m.

Oct. 21.—**Midland Junior Gas Association**: Visit to Ascot Gas Water Heaters, Ltd., Neasden.

Oct. 21.—**Midland Association of Gas Engineers and Managers**: General Meeting, Queen's Hotel, New Street, Birmingham, 2.30 p.m.

Oct. 26.—**Southern Association of Gas Engineers and Managers**: Annual General Meeting, Connaught Rooms, 2.30 p.m. (preceded by Council, 11 a.m.).

Oct. 29.—**Manchester District Association of Gas Engineers**: Autumn Meeting, Hotel Majestic, Harrogate.

Nov. 3.—**Manchester and District Junior Association of Gas Engineers**: Morning—Visit to Sutcliffe Speakman & Co., Ltd., Leigh; afternoon—Visit to Rochdale Corporation Gas Department. "Coke and Breeze Briquetting," Mr. Bardsley (Sutcliffe Speakman & Co., Ltd.).

Nov. 10.—**Eastern Junior Gas Association**: Visit to Ascot Gas Water Heaters, Ltd., Neasden.

Nov. 24-25.—**Institution of Gas Engineers**: 14th Autumn Research Meeting, London.

COAL DISCOVERIES IN SOUTH AFRICA

Valuable deposits of coking and gas coal have been discovered by Witbank Consolidated Coal Mines in the Oogies District near the property of South Witbank Coal Mines, the *Financial Times* reports. Laboratory and practical tests have given encouraging results and on the evidence available it would appear that there are considerable tonnages available for economic exploitation.

The position is being watched with the greatest interest, since the Union's known resources of coking coal is extremely limited and this shortage has always been regarded as a possible factor limiting the full implementation of the plan for the "Iscor" steelworks.

News in Brief

Price of Gas in Dublin was reduced by 1d. per therm as from Sept. 7 and the calorific value was increased from 425 to 450 B.Th.U.

A Record for Gas Production was set by the Wisbech Lighting Company during the half-year ended June 30 by producing over 100 mill. cu.ft. of gas.

Lanark County Council have approved of the erection of a dry (oxide) purification plant at the works of Uddingston Gas-works at an estimated cost of £104,250.

Burton Gas Department were on Sept. 8 recommended by the Town Council to obtain a bulk supply of gas from Derby Gas Light and Coke Co. It is also proposed to borrow £7,500 for new gas meters.

Peterhead Gas Department will reduce the price of gas by 6d. per 1,000 cu.ft., subject to the approval of the Ministry of Fuel and Power. The proposed reduction is due to a £5,000 surplus standing to the credit of the Department.

The London Gas Undertakings, comprising all the metropolitan gas companies, have started a gas cooking campaign. This is the first considerable sign of advertising co-operation since 1939 and the move is to be welcomed. The campaign, which will be for six months, aims to sell the idea of "superb cooking" by gas.

The Women's Gas Council (Dundee Branch) recently visited the works of the Dundee Gas Department. They were welcomed by the Engineer and Manager, Mr. W. S. Johnston. Among the visitors was Mr. E. S. Douglas, ex-Convener of the Gas Department, whose wife is President of the Dundee Branch of the W.G.C.

Trade Statistics for July, 1948, issued by the Department of Industry and Commerce in Eire, show imports of 29,593 tons of gas coal, valued at £134,383, as against 6,803 tons, valued at £19,671 in July, 1947. This brings the total of these imports for the first seven months of 1948 to 165,954 tons, valued at £728,017, compared with 61,741 tons, valued at £221,074, in the corresponding period of 1947.

Mr. R. Kelf-Cohen, Under-Secretary of the Gas Division of the Ministry of Fuel and Power, addressed members of Aberdeen Town Council on their last inspection as owners of the city's gas undertaking. Councillor H. G. Brechin, Convener of the Corporation Gas Committee, said he was not alarmed at the gas-works being transferred to the Government because the question of gas supplies in the country would be looked into in the hope of keeping the price reasonable to all consumers.

A Fire which broke out in the early hours of Aug. 30 in a 3,000-ton dump of coke at the works of the Peterborough Gas Company was burning four days later, although by that time much of the dump had been removed and the outbreak was nearing its end. Local contractors and works lent mechanical shovels and excavators which loaded the coke on to fleets of lorries for transfer either to the bigger industrial users of coke or to emergency dumps. Although the cause of the fire is not known, it is suggested that it may have been due to spontaneous combustion.

Dearer Gas is probable in Aberdeen. Increased charges recommended by the Gas Committee will enable the Department to wind up the year's working with a surplus of £3,433. Were the rates to remain as at present, the Committee were told, a loss of £13,400 for the year would have to be faced. New scales will come before the Town Council for approval next week. If, as is probable, the recommendations are adopted, ordinary gas consumers will have to pay 3s. 9d. instead of 3s. 6½d. per 1,000 cu.ft. for the first 10,000 used per quarter. For the next 240,000 cu.ft. the rate will be 2s. 10d. instead of 2s. 7½d. For larger consumers the rates are proportionately increased. Householders with prepayment meters will receive 21 cu.ft. for 1d. instead of 22. Rates for street lighting will also be advanced. In the past year the gas undertaking showed a surplus of £2,086, compared with an estimated surplus of £13,872.

Mr. Hugh Gaitskell, the Minister of Fuel and Power, is to attend and will address the annual conference of the National Smoke Abatement Society, which is to be held at Cheltenham on Sept. 30 and Oct. 1. A preliminary report will be given of a survey of the sources and incidence of atmospheric pollution conducted by the Society by means of questionnaires to 1,800 local authorities. The programme also includes a series of contributed "progress reports" on work of special interest being done by local authorities and other bodies. At other sessions will be papers on "Smoke Prevention in Relation to Town Planning," by J. Nelson Meredith, F.R.I.B.A., City Architect for Bristol, and "Smoke Abolition and the Public: Problems of Education and Propaganda," by Leslie Hardern, Public Relations Officer to the Gas Light and Coke Company. A novel educational feature of the conference will be a "Brains Trust on Smoke and Clean Air," to which parties from local schools, women's organizations, and other bodies are being invited. The members of the trust will include experts on health, administration, domestic heating, coal carbonization, electricity, and industrial fuel technology.

The First Cargo of Coke to leave Cork for a Scandinavian port will be dispatched by Cork Gas Consumers Company in a few days to a Swedish firm at Udgvalla.

Mr. J. L. Rogers, Australian fuel expert, will shortly visit Great Britain to investigate the production of liquid fuel from coal for the Australian Government, says a report from Canberra.

Application Forms (returnable Dec. 1, 1948) and particulars of the Associate-Membership Examination for 1949 of the Institution of Chemical Engineers may be obtained from the Hon. Registrar of the Institution at 56, Victoria Street, Westminster, S.W.1.

Two Further Overseas Economic Surveys are being published for the Export Promotions Department of the Board of Trade by H.M. Stationery Office. Iran was published on Sept. 17, price 1s. The publication date for the United States of America is Sept. 24, price 3s. 6d.

Ascot Gas Water Heaters, Ltd., held their most successful sports fete at Wembley recently, at which film stars and B.B.C. notabilities assisted in judging various competitions. One of the workers from the Neasden factory, Miss Peggy Ricketts, won the annual beauty competition for "Miss Ascot, 1948."

Dust in Industry is the subject of a conference to be held in Leeds from Sept. 28-30 by the Society of Chemical Industry. Among the speakers are Mr. E. H. M. Badger, on "Particulate Clouds in the Gas Industry," and Dr. A. G. White and Mr. E. Jones, on "Gas Explosions and Dust Explosions, a Comparison."

Motor Vehicle Licences for the third quarter of 1948, which expire on Sept. 30, may be renewed on or after Sept. 17. The Ministry of Transport asks holders of licences to make early application for renewal. Renewal forms (R.F.1A) are obtainable from any money order post office. Half-rate licences may be renewed at post offices in the same way as full-rate licences, but owners who are taking out their first half-rate licence must apply to the local taxation officer.

The Council of Industrial Design is organizing a Design Week for Birmingham, to take place from Oct. 11-16. The focal point of the week's activities will be the showing of the Council's touring exhibition, "Design Fair," in the City Art Gallery. An interesting feature will be a Housewives' Forum, at which delegates from women's voluntary organizations in Birmingham will tell a panel of experts about improvements in the design of the goods they buy in the shops and use in the homes.

Durham County Press and Houghall Show, at Durham on Sept. 2-4, included a marquee run by the City of Durham Gas Company. A full range of gas appliances attracted the attention of every visitor to the show, and the personnel of the Company had a busy three days, and many useful enquiries were obtained. Adjoining the marquee was a greenhouse, a joint exhibit by a local firm and the gas company. It was completely equipped with gas-heated boiler and fitted with temperature control. A boiling water heater was also installed at the Milk Marketing Board Stand, and for cookery demonstrations by the Ministry of Food a gas cooker, refrigerator, and boiler water heater was provided. At the catering tent, gas was used for water heating for tea-making and washing up. Gas films were also a feature of the programme.

The Women's Gas Circle, which has now increased its membership to well over 1,000, opened its new season's activities with an entertainment at the Midland Institute, Birmingham, on Sept. 9, and was attended by 600 members. Councillor Seymour J. Brown, Chairman of the Gas Committee, took the chair. The Mayoress (Mrs. J. C. Burman) was present, and Mr. Alex. W. Lee, General Manager and Secretary of the Gas Department, Lady Humphries, and Mrs. A. S. Giles (Vice-Presidents), Alderman Giles, Alderman Pardoe, Councillor Beale and Councillor Farrell (members of the Gas Committee). In her annual report, Miss Humphries, Organizer of the Circle, said that during the year £300 had been collected for charity. A cheque for £112, in aid of the Lord Mayor's "United Nations Appeal for Children" Fund Campaign, was handed to the Mayoress by Mrs. M. C. Slade.

Ranalah, Ltd., announce the new address of their Head Office and Works, situated at Lutterworth Road, Burbage, Hinckley, Leicestershire, where their range of instantaneous gas water heaters is being manufactured in various models, suitable for either town or butane gas. The G.H.1 model is retained, and is suitable to serve two points, while the G.H.1B operates on butane gas, and is suitable for country and outlying districts, caravans, &c. Both these models retain their well-known features, and can be delivered in a reasonable time. The Ranalah drying and airing cabinet, model III, is also being manufactured and may be ordered for early delivery; also the Ranalah/G.L.C. type gas units in sizes 18 in., 22 in., and 26 in. Mr. Alexander Peet has joined the Board as Works Director. A short time ago he was awarded the Royal Scottish Society of Arts Hepburn Prize, together with the appropriate Silver Medal, in connexion with the G.H.1 gas water heater.

IRISH GAS ASSOCIATION

FIRST POST-WAR ANNUAL MEETING

WHEN the Irish Gas Association met at Cork for its annual meeting on Sept. 14, there were present, in addition to delegates from all parts of Ireland, many British colleagues (including Mr. T. C. Battersby, representing the Institution of Gas Engineers, and Mr. W. Morland Fox, representing the Society of British Gas Industries) who took a keen interest in the proceedings. The meeting was held at University College and was presided over by the outgoing President of the Association, Mr. P. J. Sheehan, B.E., Engineer and Manager, Cork Gas-Works. In the unavoidable absence of the Lord Mayor of Cork, a Civic welcome was extended to the delegates by the Deputy Lord Mayor, Alderman G. F. Brewitt, who was accompanied by Mr. E. T. Mahony, Chairman of the Cork Gas Consumers' Company.

Alderman **Brewitt** expressed the City's pleasure at the attendance of the delegates and bade an especially hearty welcome to the cross-Channel representatives. He spoke in terms of the highest praise of the Cork Gas Company, a concern, he said, which was honoured and respected by every citizen of Cork. He referred particularly to the war years during which the Company had successfully overcome some of the greatest difficulties any industrial concern ever had to face. In that connexion he paid tribute especially to the work of the President of the Association, who was mainly responsible for the marvellous success of the Company during those difficult years. In addition to producing gas the Company turned out a very efficient substitute solid fuel in the shape of coke breeze briquettes, but for which many industries in the City, including his own, would have had to close down during those times of scarcity. (Alderman Brewitt is a Director of Cork's largest firm of bakers.)

Mr. **Mahony** then welcomed the delegates on behalf of his Company. Having expressed the hope that the industry which they all served would be very prosperous in the future, he said that prosperity would be measured largely by the efforts they put into their work during the next decade or so. During that time they would have a lot of competition to meet and other difficulties to overcome, but he was quite sure if they put their shoulders to the wheel they would succeed in making the gas industry more successful than ever. They all, he said, could make gas, but gas like other commodities needed selling. He hoped the delegates would give considerable attention to the question of service to the consumer, because a satisfied consumer was the best advertisement they could get. Mr. Mahony concluded by paying tribute to Mr. Sheehan, to whose efforts, he said, it was largely due that they in Cork had overcome their wartime difficulties.

Mr. Sheehan then delivered his Presidential Address, which is published in full in this issue of the "JOURNAL."

A vote of thanks to the President was proposed by Mr. **H. W. Saville** (Wexford). It was, he said, a unique address covering the whole gamut of their activities, including their wartime experiences. It was just as well to have these recorded so that it could be later remembered what they had gone through.

"I now have a very pleasing duty to perform," added Mr. Saville, "to present Mr. Sheehan with the President's Medal of the Association. There is no gentleman in the gas industry to whom I would prefer to present this medal than our President, Mr. Sheehan. He has been an outstanding man in the position, geniality itself, attentive to business, and helpful to all of us. I am sure we can give him no happier privilege than to hand him this Medal, which I hope he will retain long as a Past-President of the Association." Mr. Saville then invested Mr. Sheehan with the President's Medal to the accompaniment of applause by the delegates.

As there was an ambiguity about the ballot papers for the election of a Committee, the meeting agreed unanimously to re-elect the outgoing Committee.

Mr. **F. H. Thomas** (Limerick) was unanimously elected Vice-President of the Association.

On the abstract of accounts, which showed a credit balance of £300, Mr. **T. F. Hastings** (Omagh) suggested that a portion of that money be set aside towards the provision of a library. Mr. **L. W. Dalby** (Waterford) said the suggestion should be borne in mind. There was a great dearth of technical books in the country. Mr. Dalby also referred to the much regretted absence, due to indisposition, of Mr. W. Cole, their Hon. Secretary, from the meeting. The Committee had already sent him a telegram regretting his absence. All the members knew of the immense amount of work Mr. Cole had put in preparing for the meeting and on the transition from the Irish Association of Gas Managers to the Irish Gas Association.

At the Association Dinner held that night at the Imperial Hotel, Cork, Mr. Sheehan again presided, and there were many distinguished guests present.

On Sept. 15 the members paid a visit of inspection to the Cork Gas-Works, followed by an enjoyable outing to Trabolgan; and on Sept. 16 there was a golf competition over the Douglas Golf Links.

Members of the Irish Association outside University College, Cork, Sept. 14.

Irish Gas Association

PRESIDENTIAL ADDRESS

of P. J. SHEEHAN, B.E., M.Inst.Gas E.

Engineer and Manager, Cork Gas-Works

TO-DAY we meet for the first time since the fateful year of 1939, when the war difficulties brought the normal activities of this Association. in common with so many others, to an abrupt end.

With the return of more peaceful days it was decided to take stock of the position of the Association. It was for long felt anomalous that only those who could describe themselves as managers of a gas undertaking were considered eligible for ordinary membership. Indeed, the title of the Association as it then stood left no room for doubt on that score. This was not in line with developments elsewhere, and in effect seemed an unintentional discourtesy to many who contributed to the advancement of the industry. For who can deny the evidence of its history; many men, representing various branches of human knowledge, have contributed to this advance until to-day it has grown to a remarkable stature. The engineer, the chemist, the physicist, are but the general terms describing men whose activities can be more precisely defined in these days as civil, mechanical, or electrical, or gas engineers, fuel technologists, or chemical engineers. To these may be added others of scientific training who find scope for their specialized activities in the modern gas industry. These may be workers in the gas industry itself or serve in its various works of investigation and scientific research of a short or long term nature, or who serve in the contructional plant and equipment firms supplying the industry.

In re-forming the ranks of the Association, therefore, it was decided to end this curious anomaly by taking a more realistic view of the basis of membership so as to include all those whose professional activities contribute so much to the progress and development of the industry and its well-being.

The Institution

The Institution of Gas Engineers, founded in 1863, incorporated by Royal Charter in 1929, has grown coincidentally with the industry it serves so well in the professional and technical spheres. While raising the standard of proficiency required of aspirant members by the promotion of an Education Scheme leading to Associate Membership examination, it has likewise modified entry to include others of the same professional status from all branches of science to help forward the expansion of the industry and the solution of its problems. There is now a more realistic approach to the solution of these problems than was apparent some years ago. If scientific personnel and technical equipment can find the answer to a problem which capitalized costs say £10,000, by the expenditure of, in many cases, a much lesser sum, then it is obviously sound to proceed to find the solution, otherwise its consideration is postponed until a more favourable time or circumstance.

The Institution has evolved into its present highly organized status with its many technical committees, all committed to the investigation of important technical matters of vital interest to the industry. For many years it has pursued independently through its Gas Research Committee the problems requiring detailed investigation, in conjunction with the University of Leeds and later joining forces with the Society of British Gas Industries to form an autonomous body, the Gas Research Board. All three bodies pursue, actively, research work on behalf of the industry. For anyone who has had the opportunity of attending the Annual Meetings of the Institution, it is a worth-while experience. The perfect order and working of its complex machinery, the dignity and decorum of its proceedings, leaves an indelible impression of a memorable event. The high intellectual levels of the papers read and following discussions are invariably stimulating. It gives point to what Dr. Hartley in his Presidential Address this year has said, " It must be remembered that men do not unite in professional institutions for mundane matters only, but to retain freedom for creative thought and full development of the mind." To that I would add, if I may, " and of the arts and graces of living." For I believe the social events of the Institution week justify this, and complete the whole picture of an unforgettable experience. Whatever the future holds for the gas industry in Britain, it is to be hoped that these characteristics will be preserved and enshrined in the Institution, so that it may continue to pursue its wise and beneficent course for the well-being of the whole industry everywhere.

Before we consider briefly the growth of the industry to the present day and its future prospects, we might take a backward glance, if only to take legitimate pride in achievement and hope for the future from the lessons of an immediate past full of disheartening difficulties and bitter experiences.

The War Years

The normal growth of the industry was arrested by the incidence of world conflict; indeed it became impossible in this country to maintain gas service continuously; it was reduced to a mere few hours daily and many times its very existence was threatened. Supplies of gas-making coals dwindled to a trickle and were of the poorest quality. Reject coals and colliery waste formed the bulk of our gas-making

At the Irish Gas Association Meeting, Sept. 14. Left to right: The President, Mr. P. J. Sheehan, Mr. T. D. Hamilton (Belfast), Mr. T. C. Battersby (Watford and St. Albans), and Mr. F. H. Thomas (Limerick), Vice-President.

materials, and were of the poorest coking varieties, high in moisture and ash. From this poor material it is hardly to be wondered that the gas supply came, on occasions, dangerously near to vanishing point. The operation of vertical retorts became practically impossible and charging and discharging of horizontal retorts by machinery was accomplished only with the greatest difficulty. The maintenance of machinery and plant under such conditions presented increasingly grave problems. The production of coke virtually ceased and coking varieties of coal were carefully segregated and blended with the object of providing suitable producer fuel. Producer firing presented its own problems and cleaning of the fires had to be undertaken at shorter intervals in an effort to abate heavy clinkering troubles.

The conclusion of hostilities left arrears of plant renewals and urgent reconstruction problems with materials of all description in short supply. Slowly and painfully we are emerging from the years the " locust hath eaten," for whatever claims are made to the contrary, the evidence is that modern warfare is both senseless in its destruction and inimical to human progress; any incidental scientific gains are but ephemeral and purchased at an awful cost. We have now to repair the ravages of these years and try to overtake arrested development. Having considered the past years briefly, let us try to fit them into the perspective of the story of gas.

In its long history there have been phases of rapid, almost spectacular advance, following notable technical progress. The advent of electrical competition at the close of the last century, strangely enough, heralded a new period of advance, doubtless, because of the stimulus it provided. The advances in the applied sciences on which the industry is broadly based likewise gave a new orientation to its development. In the beginning the emphasis was on a lighting service, chiefly public or street lighting. This was the first great achievement of the industry, and advance in domestic routine. The incandescent mantle, providing a notable improvement in lighting standards, paradoxically brought about a fundamental change. The importance of the heating value

of the gas, rather than its power as an illuminant, came to be realized. The development of the cooker, gas fire, and water heater followed logically. The Gas Regulation Act of 1920 (in Ireland 1928) set the seal on this new phase. Gas-works have come to be appreciated as great power houses of potential heat energy in our time.

The Gas Industry To-day

As an instance, the undertakings of this country provide annually some 52 mill. therms of gas, or the equivalent of 1,500 mill. electrical units, and provide in the process 55 mill. therms approximately of heat energy in the form of coke for sale, together with valuable by-products such as road board tars and fertilizers, without enumerating them all in detail. From this great reservoir of gaseous heat energy, the aim of the industry is to provide (1) an uninterrupted supply of constant quality; (2) obtainable on demand and in any quantity desired from (3) coals of suitable quality. These three considerations materially influence the choice of plant and processes for the manufacture of gas. The Gas Regulation Act gave needed freedom in the choice of calorific value so that it is possible to declare a value which is the most economic one for a particular undertaking and its operating conditions, viz., (*a*) coals available; (*b*) plant installed; (*c*) the adequacy of its distribution system to meet the demands upon it; and (*d*) the relative prices of coal and coke. Notwithstanding this liberty of choice, there is a tendency to stabilize around three standard values—450 B.Th.U., 475 B.Th.U., and 500 B.Th.U., which seem to satisfy most normal requirements. Usually values as low as these raise the question of dilution, by some outside means, of coal gas produced in the main carbonizing plant, except in the case of vertical retort installations, where the steaming of the hot coke produces water gas, and, of course, good quality water gas cannot be made unless the reaction takes place at 1,000° C. within the retort. This sets a practical limit to the extent of the steaming process.

An early Fuel Research Board report on the effect of increasing degrees of steaming on a gas coal, from 0 to 30% by weight of the charge, showed that the make per ton was almost doubled with maximum steaming, and the quality was progressively diluted from 544 to 432 B.Th.U. gross. The final calorific value of the mixed gas, the speed of throughput, and the quality of the coke produced (percentage of ash increases with steaming) are some other limiting factors.

Dilution by producer gas in outside plants is only practised to a limited extent. The method finding widespread adoption is by carburetted water gas generated in separate plants. These have been developed to a high state of thermal and mechanical efficiency. The continuous removal of clinker by revolving grate, provision of jacket and waste heat boilers, thermal insulation of all vessels, auto-control of cyclic operations, automatic coke hoisting and charging, make them virtually "labourless" and free the gas-maker from any preoccupation with details, to the possible neglect of his main duty.

This process has become the chief auxiliary to carbonization in town gas manufacture, assisting in control of the coke market, and by reason of its flexibility in meeting peak-load demands and in augmenting the total output at will; these features have given rise to the description—tactical use of water gas. The main carbonizing plant is primarily "base-load" plant. There is the seasonal load also to be considered. A study of all the factors and the characteristics of available plant will determine the most suitable combination for any given undertaking, of base and peak-load plants.

Still "Two Fuels"

Superficially, it may seem strange that with the means to gasify our coals completely, the industry should still remain a "two-fuel" one, but this position is likely to be with us for many years to come, for the increase in gas sales means a corresponding increase in the production of coke for sale, which is enhanced by improvements in the fuel consumption of main carbonizing plant. This latter point is dealt with fully in recent papers by Pexton and others; figures as low as 12 lb. dry coke per 100 lb. coal carbonized have been realized in the case of continuous verticals, increasing somewhat for the static systems. These improvements have been brought about by improvements in (*a*) producer design; (*b*) combustion and distribution of hot gases within the settings; (*c*) recuperation and/or "waste-heat" recovery in the form of steam; and (*d*) insulation of settings.

Economies in the utilization of steam so raised, by a study and balance as between power and process requirements, can be carried to further lengths. With the modern tendency towards integration of undertakings, which inevitably means a reduction in the number of manufacturing units, with a corresponding increase in size of the fewer remaining units, some further economies in works fuel consumption may be anticipated. All this merely increases the amount of coke for which the industry must find a market. This tendency is offset in some degree by the increasing use of water gas and the practice of steaming, which we have already briefly considered. This has checked coal consumption and reduced coke production. Finlayson and Townend, taking a 20 years period, 1921 to 1941, in Great Britain, gave the figures—"Total amount of gas made and purchased (coke ovens) by the industry rose by 44%—coke and breeze for sale rose only by 20%." Further, that if the gas made and purchased in 1941 had been replaced by coal gas as produced in 1921, there would have been approximately 6 mill. tons more coke and breeze for sale in 1941.

Whatever the improvement in the coke gas ratio, it would seem that the disposal of coke must loom large in importance for many years to come in the economy of the industry, for in base-load plant, the cheapest therm of gas is still only obtainable from our familiar high temperature gasification plants and this involves the production of 2 therms of coke. This important market must, therefore, not be neglected. It should be developed and new outlets found for the use of coke, both in the domestic and industrial field. Firstly we must produce the best possible coke, and here we start under handicap if coals of a reasonably low ash content are not available. The coke must be low in moisture content, free from breeze and smalls, and of correct sizing for the particular use. The revenue from coke sales can assist materially in reducing the cost of gas production, but this result can only be achieved by attention to quality, grading and proper marketing. There must be a sound coke sales policy, backed by good advertising, and this must not be a haphazard affair, only receiving attention when coke stocks prove an embarrassment. Some information attractively conveyed, other than price, should form the matter of our advertising.

Continuing Expansion

There is no doubt that gas sales will continue to increase—it is a fully automatic fuel and modern tendencies are in that direction. What is not so equally clear is whether the extra coke produced in meeting this likely expansion in gas sales can be disposed of readily unless we stir ourselves to find new selling opportunities and develop existing ones. The domestic coke boiler has been the subject of much improvement in performance and design, and where warmth in the kitchen is required, as well as copious supplies of hot water, it fills the requirement adequately. When the coke is gas ignited and the boiler is supplied in conjunction with a gas circulator or heater for use in summer, there is a combination equal to the domestic adjustments which must follow from the vagaries of our climate.

In fact it would seem that "whole-house" heating by gas, if it is to have large scale adoption, will depend upon the satisfactory disposal of the greatly increased output of coke involved. In any case with present methods, such a development could hardly take place unless cheap gas could be provided, and this in turn is dependent upon satisfactory coke disposal, notwithstanding that the larger outputs of gas and a good load factor would reduce distribution costs, and justify the conversion of still larger amounts of coke into gas without extra cost.

On a rough estimate, for the 20-year period before the war, there was an improvement in the processing of coal, plus an increase in the efficiency of its utilization in the form of gas, of the order of 40%. It is hardly likely that improvements in the near future can be maintained on this spectacular scale. It is to be remembered, however, that by reason of the greatly enhanced costs of coal, minor economies in fuel consumption in the carbonization of coal and improvements in the overall efficiency of the process may well come to an appreciable amount: (1) recovery of sensible heat in the coke and waste gases; (2) good producer operation; (3) efficient boiler and steam plant operation; (4) attention to insulation of all boilers, steam lines and vessels; (5) the use of superheaters, economizers and feed-heaters, with control at every point by indicating and/or recording instruments, used intelligently, and with some knowledge of their limitations; (6) frequent analysis of flue gases, temperature readings of combustion chambers and at other points as a matter of routine if possible, will help in perfect combustion control, and are all means to the same end of fuel economy.

There is great scope for development in the field of instrumentation on a gas-works, and with the present high cost of its primary raw material, it will pay us to review our position in this respect. Costs of good instruments are generally repaid many times over by the economies effected in use.

Mention has been made of boiler feed water heating by the use of heat in the exhaust steam from exhausters or gas compressors. The exhaust steam from washer/scrubber or smaller non-condensing engines can often be effectively employed for the heating of workshops

At the Annual Dinner. Left to right: Mr. E. T. Mahony (Chairman of the Cork Gas Consumers' Company), Mr. P. J. Sheehan (Association President), Mrs. Sheehan, and Mr. G. Gresle Farthing (Humphreys and Glasgow, Ltd.).

or stores in fairly close proximity, with an alternative discharge to atmosphere through exhaust heads in milder weather. If care is taken in such installations quite an appreciable amount of waste heat is recoverable, without a significant increase in back pressure on the engines.

Ideals to Aim At

At the outset we outlined three desiderata: (1) an uninterrupted supply of *constant quality*. If, by reason of the size of our works and output, we are not compelled to operate under statutory conditions of declared calorific value, it would be the worst possible folly to mistake liberty for licence in this matter. If the cost of a Boys' standard calorimeter seems prohibitive, there are cheaper reliable indicators which should be used in any case. There should be control of condensation, tar extraction, washing and purification, up to the limit of our resources—then we shall be coming nearer the desired constant quality. *Uninterrupted supply* pre-supposes routine attention to siphons in works and district, and freedom from deposits in mains and services, and leads logically to point No. (2): *Obtainable on demand and in any quantity desired.* Are we satisfied with the statutory minimum of 2 in. W.G. at the consumer's meter, and do we really look upon it as the absolute minimum below which our pressures should not be permitted to fall ? If a full domestic gas service is at any time required in the home, do we not realize that 4 in. W.G. is nearer the mark ? Have we considered our peak-load output, and divided by the total number of our consumers, and are we satisfied it would suffice to cook a good meal, if all consumers desired it at the same time ? Or have only a privileged few living in close proximity to our works this facility ?

Point No. (3), *From coals of suitable quality*, has already had some consideration, and the desirability of obtaining, as far as possible, good coking coals of low ash content has been stressed. We should establish a working criteria for evaluating coals on a quality basis —it is but a truism to say that cheap coals can sometimes prove too dear for use. By reason of the present high cost of good gas-making coals, this merits closer examination. If an elaborate assay apparatus is beyond the resources of most undertakings, some cheaper laboratory equipment should be available for the purpose of testing coals.

Full advantage should be taken of modern improvements in plant and equipment. These cover the whole field of gas-works processes, and mechanical equipment for the conveying and handling of gas-works materials. If the outlay on a machine is justified by the economy offered, having regard to its useful lifetime, plus maintenance, running costs and interest charges, there is every reason to go ahead with its purchase, particularly when there is such a volume of work as will keep it usefully employed for long periods. There have been few fundamental changes in horizontal retort practice. The new scrubber standpipe system incorporated in the recent South Metropolitan installation merits attention. There have, likewise, been detailed improvements in retort house governing on the relay system, and these have been brought to a high standard of perfection. This, of course, applies equally to vertical installations. Bench bracings, particularly in the latter case, have been the subject of improved design. Dust extraction in the retort house is finding increasing favour and these amenities are overdue and to be welcomed—improvement in working conditions usually pay dividends.

Stoking Machinery Improvements

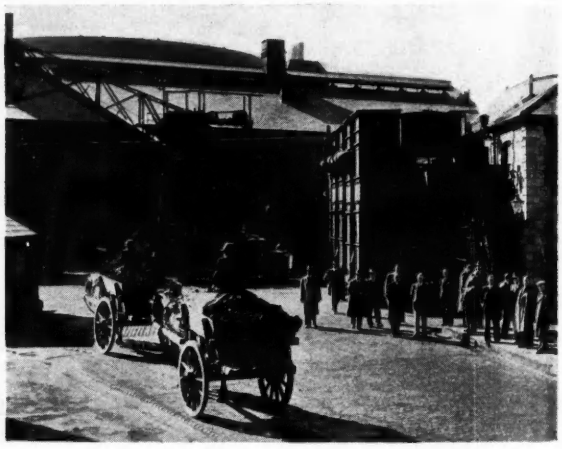
Improvements in stoking machinery have been progressive. Condensers have evolved from the atmospheric type to vertical steel water tubes in cast iron cases, to horizontal types for high efficiency, and thence to a higher efficiency vertical type of multi-pass or zig-zag pattern. Exhausters, absorbing less power in friction, are finding favour. Electrostatic precipitation, for the almost complete removal of tar fog, is superseding less efficient methods of tar extraction. Static washers of new design are replacing the vertical centrifugal type washer/scrubber, which was a later development of the rotary horizontal type, though never entirely supplanting it. There have been few fundamental changes in dry purification plant since the Croydon tower purifiers, which have not had general adoption. There has been much interest in the use of highly reactive and synthetic materials, and in the Fulham experiments to step up sulphur removal in the form of H_2S, thereby increasing many times the present box capacity. The installation at Harrow for the catalytic removal of all sulphur compounds other than H_2S with benzole extraction following, shows a growing appreciation of the imperative necessity of producing sulphur-free gas. The assistance to maintenance, particularly of pin-hole type burners and flueless radiators and heaters needs only to be stated to be appreciated. Excessive sulphur can be most damaging to the whole reputation of gas as the highest class clean and automatic fuel.

The interest in wet purification methods has not diminished but no practical schemes have so far developed. Station meters of the older (though positive) types occupying much space are not likely to survive the newer ideas, based on the Roots blower principle, and other high rating smaller machines. The familiar counter-balanced bell type station governor—a fine straightforward machine —again for reasons of size, may have to give place to the diaphragm type. There has been little change in gasholder design and construction, if we are to leave out of consideration the high pressure type for particular application, except in the increasing use of welded construction, due doubtless to improving technique and economy. Machines for the handling of gas-works materials of all kinds have rapidly developed, but this question will form the subject of a separate paper which will be read later to-day.

Mechanical Efficiency

The mechanical efficiency of the works is second only in importance to its thermal efficiency and it is important at every stage to study the " flow " of our processes. The idea is a familiar one in the motor-car and other industries. The keynote of the system is the assembly line, or main conveyor, and to it at the right time and place is fed by subsidiary conveyors, the particular component required for assembly in the rapidly growing machine, which will soon become the finished product. The components themselves may be built up in a similar way on their own subsidiary conveyors or assembly lines, en route to the main line. It would pay us to study our works and system from this angle, with a view to improving " flow " conditions.

The methods of operational research which proved so helpful to the military tactician during the late war, gave him precise data of expectations from particular methods of use and concentration of weapons in any desired operation, and with this knowledge helped in forming a true assessment of the worth of the particular operation in the furtherance of the overall plan of campaign. These methods took away much of the guesswork and speculation which surrounded these things in the past, and which so often proved lavish in expenditure of human life with no better military result than bitter defeat and reverse. Similar methods of applied science can be extended to cover all spheres of production and utilization of gas and coke, and in the promotion of market research.



Cork Gas-Works on the occasion of the visit of the Irish Gas Association, Sept. 15.

For the Future

The past 10 years have seen remarkable advances in the industrial applications of gas and this has grown into an important load for the industry. In many cases of continuous shift process work it is a most desirable " off-peak " load. Infra-red installations of very large size of the drying of motor-car paintwork have been reported recently in the Technical Press. The catalogue of uses of gas in industry is now an extensive one. Better control of temperature and high thermal efficiency of use, together with its convenience and the fact that no transport or storage provision is necessary, accounts for the popularity of gas. The use of gas for central heating and bakers' ovens should be developed by promotional tariffs. The domestic field is very far from saturation, even if no account be taken of new housing developments. The use of gas or gas and coke appliances should be investigated in the case of all householders with a view to advising on the best equipment which could be installed to meet the full requirements of the household and its particular problems of heating, cooking, refrigeration, or other domestic needs. The war years have left a legacy of arrears of house building, and the speedy solution of this grave social problem we should be actively interested, and in our particular sphere of activity by advertising, demonstrations, all-gas houses or gas and coke houses, our prospective consumer should be placed in possession of all the facts to help solve his problem in the most economical way.

We have briefly considered the possible trends towards complete gasification. These may well be along the lines of existing practice with possible increasing use of water gas for " base-load " duty. The Simon Report on domestic fuel policy in England envisages an increasing use of coke for some time to come, so the balance is likely to be maintained without a revolutionary change in methods. For

however long the industry continues to be a "two-fuel" one, both products must continue to be sold in a highly competitive market. The fortunes of both are inextricably bound together. The same high standards must prevail in the production and preparation of both fuels for their respective uses. A failure of either will inevitably lead to the failure of both.

Competition from other fuel and services is only a challenge to do better. We have a special, important public service to perform and only the best standards are good enough. This challenge is stimulating. All public services must in the end be complementary, so in a true perspective, there is no fundamental conflict. There is every evidence, however, that gas shall for long continue to provide its unique social service, so making its own worthy contribution to the story of human progress.

You did me a great honour a year ago by appointing me President of this Association, and it is with feelings of some regret that I come to the end of my term of office, for though it has meant some additional work, this was more than repaid by the enjoyment of the friendships I have formed, and in retrospect will provide many happy memories and reflections.

MECHANICAL EQUIPMENT*

A REVIEW OF TROUBLE SAVING MACHINERY

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OVER the course of the last 100 years, the gas industry has been of ever-increasing service to the public, to industry and to the nation. It has expanded from very small beginnings to become the country-wide undertaking that it is to-day and although in our own country, with its comparatively small population, almost 12,000 mill. cu.ft. were produced last year, this huge quantity seems only to be whetting the appetite of gas-hungry consumers.

The production of gas to-day is basically the same as it was in the days of William Murdoch, but there have been developments; just as Hero's fountain has been developed into the gas turbine so the gas industry has, by patience and effort, been developed into what it is to-day.

Seventy Years' Inventions

During the development of the industry the horizontal retort became the inclined retort and finally the vertical retort before losing favour to the present-day complementary coal gas systems and, although the improvements in design and operation, coupled with the refinement of the materials used, resulted in great advantages to the industry, still it was the adoption of mechanical equipment and its wider application following the inventions of the last 70 years which has proved to be the greatest asset. For not only has the history of the gas industry been the story of mechanical development, but mechanical development has also enabled materials—the industry's stock-in-trade—to be handled in places and in quantities where it was physically impossible for labour to complete. In fact mechanical methods are to-day employed to such an extent that the horizontal setting now absorbs about 18 men per mill. cu.ft. of coal gas per day, the modern vertical retort installation almost 11 men per mill. per day and the highly mechanized carburetted water-gas plant between four and five men per mill., while the works labour force has been reduced to the region of 30 men per mill. per day; but even 30 men per mill. is probably twice as many as the future modern gas-works will require.

The general use of machinery, especially for the handling of coal, coke, breeze, ashes and oxide of iron, is increasing and as many Irish gas-works still manually handle a substantial proportion of the 1,000,000 tons annually dealt with, there is ample scope for more mechanized handling methods.

Many of the machines in use on gas-works to-day, however, are now so commonplace that they are often regarded as built-in features of the plant and, apart from maintenance, the majority of them receive scant consideration; therefore, before describing in detail the mobile machines which prompted the writing of this paper and whose use will no doubt be reflected by a gradual reduction in the works labour force, I wish to give some little attention to the more familiar types of labour-saving machinery.

Now, regarding the delivery of materials, all coal, as well as most of the supplies of other raw materials, has to be sea-borne to Irish gas-works, so perhaps it would be of interest to begin by stating how the two largest gas-works, both of which are fortunate in being equipped with river basins, get their principal raw material.

The Dublin Company transports its coal supply in its own fleet of four 400-ton colliers, while Belfast receives coal by means of a number of 100 ton barges. Both discharge by grabbing crane and belt conveyors—in one instance two 5-ton grabbing cranes discharge into one of a series of five 36 in. troughed band conveyors, capable of conveying the coal at a rate of 200 tons per hour. Although each crane is capable of discharging well over 100 tons per hour, it has been found in practice that the discharge of barges reduces the total rate of discharge to about 90 tons per hour. In the other instance, three travelling slewing cranes, powered by 50 b.h.p. hoisting and eight h.p. slewing motors, discharge through breakers into 24-in. belt conveyors and have a combined output of 140 tons per hour in practice.

Other methods of discharge include the wagon tipper, but I am not aware that any inland gas-works in this country yet uses wagon tippers, consequently their use is confined to undertakings outside this country, where I believe the modern end tipper tilts through an angle of 50° to discharge its load, and the rotary tipper turns the wagon about its longitudinal axis until the contents flow out over the side independently of doors. In the design, it is arranged that the centre of gravity of the wagon and its load, is very near that of the frame so that very little power is required for the operation. An 8 h.p. motor is sufficient to tip the standard 12-ton wagon. Tippers are now designed to take any size of wagon and are capable of handling up to 200 tons per hour. All rotary tippers deliver into underground hoppers, while side tippers are able to deliver into hoppers that are largely above ground. Once the coal is received another great labour saving machine, the coal breaker, is used, and as there is at the present time a high proportion of large coal delivered, nearly all works once again reduce ordinary run-of-mine coal, which is too large to be used in carbonizing plants, by a mechanically operated coal breaker. The single-roll breaker, 24 in. wide, has generally a 22 in. diameter roll, and when revolving at 60 revs. per minute is capable of dealing with quantities up to 50 tons of bituminous coal per hour.

Elevators for Charging

Elevators are next used as both horizontal and vertical works require coal at varying heights up to 120 ft. for the purpose of charging horizontal retorts or feeding the overhead bunkers of vertical retort installations and in deciding on the most suitable type of elevator, a variety of factors have to be considered, such as quantity to be elevated per hour, ground space required, capital power and maintenance costs and also whether elevator is to be used for coal only or for coal, coke and other purposes.

On small to medium-sized works the 20 cwt. goods-passenger hoist is a very useful multi-purpose machine requiring little ground space, elevating coal between breaker and bunkers at the rate of 5 tons per hour, delivering coke for producers, for charging retorts after scurfing and hoisting spare gear. Hoists are relatively cheap to install and absorb about 2½ units per hour when driven by a 5½ h.p. motor. Maintenance is amply covered at under a penny per ton of materials hoisted, and even when fully complying with Factories' Act requirements, one such hoist is capable of serving the needs of a vertical retort installation of 130 mill. per year output.

Fixed bucket elevators, with capacities from 12-70 tons of coal/hr. and absorbing about twice the theoretical power required to lift the coal to the vertical height, are still extensively used for elevating coal to boilerhouse bunkers. They are part of the horizontal retort charging machine and may occasionally be found elevating coal on vertical retort installations, although they are nowadays being replaced on new plant by conveyors of one type or another. Electric telphers have been serving gas-works for over 40 years; but as means of lightening the load on the telpher system and saving power at Dublin, aluminium alloy plate skips were recently constructed to the same dimensions as the conventional steel skip, and after some months experience it can be said that wear and tear have been less, noise reduced and tipping easier.

Pushplate conveyors or scrapers are still used and have capacities from 20 tons per hour to 150 tons per hour, although they are nowadays largely being replaced by either the shuttle band or flat belt conveyors. As ground space is of major importance in gas-works, most vertical retort plants and many other types of plant, such as overhead purifiers still use gravity bucket conveyors. The chief point in favour of their use is their pivoted buckets which enable them to convey vertically, horizontally or at

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any inclination. The modern lipped bucket type dispenses with the necessity of a rotary filler, which was a familiar feature of the ordinary gravity bucket conveyor. Mechanical lubrication is an improvement on the old method and has resulted in lower maintenance costs and longer working life. Gravity bucket conveyors usually run at speeds between 45 and 55 ft. per min. and have capacities of 25 tons to 120 tons per hour when conveying coal.

The skip hoist has many points to recommend it. It is a simple machine with few moving, and consequently, wearing parts, the wear taking place mostly on the steel neck of the chute and the skip bucket itself, but only to the extent of causing the renewal of a 20 cwt. skip, built of $\frac{3}{16}$ in. plate, for every 100,000 tons of coke hoisted and they are mainly used in this country for coke hoisting. Both the counter-weighted and twin skip types are extensively employed in inclined and cranked structures with lifts up to 120 ft. and higher. They are capable of speeds up to 300 ft. per min. and outputs up to 100 tons per hour.

It is only in band conveyors however that the great advantages of lightness and strength have been combined with quiet running and large capacities. Any arguments against their use should be regarded only as an obstacle to be overcome, for flat and troughed belt conveyors have very wide application in industry and are acknowledged as the most economical method of transporting coal and coke over distances which are mainly horizontal, because the handling of coke limits the angle of inclination for successful conveying to 16°, but mixed lump and fines may be conveyed up to 20°.

The speed and width of belt conveyors are governed by the weight and size of material to be conveyed, 2 in. unsized material requiring, as a minimum width, a 12 in. wide troughed belt, 8 in. unsized a 24 in. wide belt, and 24 in. material a 48 in. troughed belt. To reduce cuts and damage to the rubber and duck of the belt, lump material should be fed on to the belt at its running speed, large lumps being delivered more slowly than fines and feeder points being provided with rubber covered rollers to lessen the effects of impact. Belt speeds vary between 100 and 600 ft. per min., but when conveying lump coal the speed is usually 150 ft. per min., the 48 in. belt delivering 262 tons per hour at this speed, and the 12 in. belt delivering 33 tons of small coal per hour when running at a speed of 300 ft. per min., the flat belt having, of course, approximately half these capacities.

I do not intend to weary you, however, on this social occasion with a tiresome recitation of the performance of belt conveyors or with a description of the laborious calculations for the horse-power required, but performances and horse-power formulæ for conveyors have been quoted for your convenient reference.

Faithful Servants

Now these are some of the fixed machines with which we are all more or less familiar and they have already served as long and faithful servants in the bigger works and in their smaller sizes are ready to assist, when it becomes an economic proposition for the smaller works with expanding outputs to grasp the means at their disposal to reduce labour charges.

BELT CONVEYORS

(Rubber-covered Type)

B.S.S. 490, 1933

Gas-works use Grade A

Tons per hour

Belt Idlers No.	Belt Width In.	Material weighing 50 lb./cu.ft. Belt speed : Feet per minute 100	200	300	400	500	600	Minimum width for material Unsized In.	Sized In.
5	48	175	350	525	700	875	1,050	24	14
5	42	140	280	420	560	700	840	20	11
5	36	100	200	300	400	500	—	18	9
5	30	70	140	210	280	—	—	14	7
5	24	45	90	135	180	—	—	8	4½
3	20	31	62	93	—	—	—	5	3½
3	18	25	50	75	—	—	—	4	3
3	16	20	40	60	—	—	—	3	2½
3	14	15	30	45	—	—	—	2½	2
3	12	11	22	33	—	—	—	2	1½

Power absorbed

Horizontal conveyor : $H.P. = \frac{LS(X + Y + Z)fd/D}{33,000}$

Where :

L = Centres of conveyor in feet
S = Belt speed in feet per minute
X = Weight of revolving parts of idlers (*i.e.*, rollers) per foot of centres.
Y = Weight of 2 ft. of empty belt
Z = Weight of load on 1 ft. of belt
d = Diameter of idler bearings
D = Diameter of idler pulleys (rollers)
f = Coefficient of friction in idler bearings.

If the conveyor is inclined, power for lifting the load must be added. Approximate rules are :

H.P. = (0.0002L + 0.001H) for plain bearings for roller (or ball) bearings.
A.P. = From T (0.000095L + 0.001H) for 36 in. belts to T (0.000125L + 0.001H) for 18 in. belts, where
L = Centres of conveyor in feet.
T = Capacity of conveyor in tons/hour.
H = Height of lift in feet.

As a competitor of labour in the yards of both large and small gas-works, the standard ½ yd. motorized shovel is an old friend. Its rated output is usually quoted as 25 tons of coal per hour and under ideal conditions such as two or three shovels working together when feeding a stacker each can, on average, approach very close to the rated 25 tons/hr. Prolonged spells of arduous work, however, induces a degree of fatigue in the drivers that is not to be encouraged and it is generally found that the output per shovel, especially when loading direct into lorries, settles down to a steady 20 tons/hr. The cost of operation based on 1,800 working hours per year and current rates for wages and fuel, together with the total overhead charges on the machine, amounts to an estimated 11s. 10½d. per hour, or 7d. per ton.

For the hundred and one jobs on the district of a moderate sized works the excavator has proved to be a very useful machine. It has standard equipment which enables it to function in eight different ways, but it is, however, better known in the works as a forward acting shovel or as a 2-ton crane and on the district as a skimmer or backacter for trench digging. Mounted on crawler tracks it is sufficiently mobile to do most jobs and the standard ½ cu.yd. size will load 27 tons of coal/hr. or pick up and stack 16 tons/hr. Powered by a 27 h.p. diesel engine and weighing 8 tons it can get through a 10 ft. 6 in. doorway and with 20 ft. headroom can work in a 26 ft. circle. Provided the machine is confined to materials weighing not more than 50 lb. per cu.ft. some makers will supply the machine with an oversize ⅝ cu.yd. bucket giving it an estimated loading capacity of 45 tons per hour and costing 12s. 9d. per hour to operate or just under 3½d. per ton. Thus it is a big factor in keeping down handling costs—which are to-day in the region of 1s. 2d. per ton when employing manual labour.

The cost of handling so far as trimming coal, coke, breeze, ashes and oxide are concerned, has recently been considerably cheapened when compared with the cost of manual labour, by the introduction of machines which are so little known as to be considered new to the gas industry, and as I have not yet seen any referenec to the performance of these versatile machines in catalogues or elsewhere, I hope this short account of our experience and deduction at Dublin will be of interest and perhaps use to the members of the Association.

During 1947 it was necessary to stock rapidly very large quantities of coal as American coal was at that time being delivered in 10,000 ton cargoes, and everyone was anxious to improve on the stipulated out-turn of not less than 1,000 tons per day. Dublin's dockers, reinforced by practically all surplus casual labour, were busily engaged discharging three and often four American cargoes simultaneously, and in view of the inducements offered by the coal merchants over and above all that could be wrung from them by strikes and threatened strikes it was not surprising that our maximum daily complement of 90 men for coal trimming was not readily forthcoming. To combat this situation inquiries were hurriedly made regarding the hire of additional mechanical equipment for coal handling and among the number of machines viewed was a large new bulldozer.

Bulldozer's Remarkable Performance

It was at that time, and perhaps still is, the largest machine of its type in Eire, being a diesel engined D8 caterpillar tractor, fitted with an angledozer. It was hired at a price based on the rates quoted in the British Statutory Rules and Orders, 1941, No. 1277, and amended by S.R. & O., 1947, No. 915, for Plant (Rates of Hire). The amount of coal it could trim per hour or per day was unknown but driven by its skilful operator it soon became a source of never-ending wonder, and on one occasion trimmed 300 tons of coal per hour to a height of 10 ft. and in that date it actually trimmed and consolidated over 2,000 tons of coal. It was immediately noticed that the bulldozer was a machine of more than ordinary promise for it could also trim coal in a narrow yard at a rate per hour where it would have been impossible to employ the equivalent number of men.

With such large quantities packed against long stocked coal and old walls "hot spots" occasionally developed, and when this occurred the bulldozer climbed the coal face and waddled across to the affected area to cut a channel back to the coal face, often 75 or 100 yds. away, to enable transport to get through for the removal of the hot coal and it did this in as many hours as a gang of men would require days.

Breeze could be rapidly and cheaply stacked to any desired height and in periods of reduced sale even light gas coke was trimmed without noticeable crushing into heaps of anything up to 15 ft. high. It was also a boon in the purifiers shed where it was general practice when emptying ground level boxes to employ transport for removing the charge from the box and to dump it across the the concrete floored shed, a comparatively short distance away. Provided the oxide was not spent it was then turned over, aerated and broken several times; mixed with the requisite quantity of fresh oxide and prepared for another fouling.

This operation usually engaged 12 men for a week. Now when digging a purifier the oxide is shovelled over the side on to the

concrete floor and every two or three hours the bulldozer visits the shed and pushes the heap across the floor in a matter of minutes, allowing the digging to proceed without interruption and eliminating waiting transport. Later, when the bulldozer can be spared, it turns, crushes and mixes the 120 ton charge several times in the course of nine or ten working hours. Thus on this job one machine hour equals at least 50 man hours and incidentally results in a more uniformly sized and mixed charge. As you know, the delivery of new oxide is a relatively slow process and most works keep a number of men trimming loads as they arrive and standing-by in the meantime. With a bulldozer on the works the trimmers are not necessary; the loads can be dumped over the floor of the shed and at the end of a day's delivery the new oxide pushed into a heap 15 or 20 ft. high in half an hour or so.

This heaping of material to a greater height than it could be manually trimmed saves a great deal in ground space, and so far as coal is concerned, can easily double the capacity of the coal yards and treble the capacity of the others, permitting greater stocking in the most convenient yards for a short haul to the works and substantially reducing transport costs.

When laying down emergency stocks in outlying yards bulldozers are invaluable. All other forms of mechanical stacking machinery can be dispensed with, and they can quickly clear and level the site if necessary and consolidate the ground by dragging a heavy roller behind them. When fitted with suitable equipment they have a variety of uses, such as road ripping, scraping and grubbing, and when fitted with a winch they become a powerful hoisting medium.

A bulldozer is, of course, essentially a tractor fitted with a hydraulically operated detachable frame, carrying the bulldozing blade which can be raised or lowered as desired, and when equipped with a frame which permits the blade to be angled and tilted, it is called an angledozer. The angledozer is a more suitable machine for gas-works use, for the angling of the blade enables it to work close to walls and purifier boxes, while the combined angling and tilting of the blade permits the machine to negotiate the narrow gates which are often at the entrance of spacious yards. There are several makers of these machines, each of them manufacturing a range of sizes and denoting them by code, such as D2, D4, D6 and D8, also TD-6, TD-9, TD-14 and TD-18.

For instance, the TD-14 is a 54 h.p. tractor driven by a diesel engine and when equipped as an angledozer with full tanks and driver, has an all up weight of 11 tons. The blade is 11 ft. 1 in. wide, while the machine is 15 ft. long and 7 ft. 6 in. to the top of the spark arrester of its vertical exhaust. It carries a 24-hour supply of fuel oil and when working to capacity can, on average, trim 180 tons of run-of-mine coal to a height of 10 ft. in an hour. Thus at this rate of working it is equivalent to the sustained effort of approximately 70 men. For your guidance I compiled the following table on a range of angledozers.

Listing under the heading of "Dimensions" the principal physical features that would initially claim the interest of an engineer. Under "Performance" is recorded the number of tons per hour the machine will deal with when working to capacity. The table represents the condensed experience of trimming well over 150,000 tons of materials using three sizes and two types of angledozers and interpolating the quantities for the other sizes. "Annual Charges" have been based on rates of wages for driver and helper not likely to be exceeded in this country, plus the maximum price, including tax for diesel oil and the amounts for interest and depreciation, track and other maintenance on the experience of both Irish and English agents who sell and service these machines.

"Cost per hour" and "Costs in pence per ton" have been deduced from "Performance" and "Annual Charges," based on 1,800 working hours per year, for good maintenance of these machines demands one hour per day for filling tanks and light cleaning of tracks, etc., and Saturday mornings devoted to washing, cleaning and greasing.

The Dozer-shovel is a recent development of the bulldozer and is again basically a tractor with a differently shaped hydraulically operated frame mounted so that the blade or bucket can be raised to a much greater height than is the case with the blade of the bulldozer. When operating as a dozer the blade is attached to the arms and if it is desired to convert the machine into a mechanical shovel it is only a simple field operation to remove the blade and attach the bucket.

At present this machine is only made in two sizes, the 29 h.p. TD-6 and the 38 h.p. TD-9. The TD-6 is the first machine of its type in the British Isles and can be used as a utility crane for both bucket and blade carry a welded-on hook from which a chain can be slung.

It can easily lift and carry a 30 ft. length of 18 in. by 6 in. R.S.J. The TD-6 dozer-shovel is equipped with a 62 in. wide bucket of 1 cu.yd. capacity (struck measure) and has a clearance height when tipped of 7 ft. It can get through gates or doorways

ANGLEDOZERS

Dimensions

Tractor	H.P.	Weight Tons	Overall dimensions L × B × H	Speed m.p.h. Minimum/maximum revs.			Fuel tank	Consumption Gal./hr.
TD-18	70	14	17 ft. 9 in. × 12 ft. 5 in. × 7 ft. 6 in.	1.5	5.7	3.3	50	2.0
TD-14	54	11	15 ft. 1 in. × 11 ft. 1 in. × 7 ft. 6 in.	1.5	5.8	3.4	37	1.5
TD- 9	38	8	13 ft. 3 in. × 10 ft. 1 in. × 6 ft. 7 in.	1.5	5.3	1.7	26	1.1
TD- 6	29	6	11 ft. 7 in. × 8 ft. 7 in. × 6 ft.	1.5	5.4	1.7	16½	0.7

Performance

	Coal	Coke	Breeze	Manoxide	Remarks
TD-18	250	140	180	180	Tons per hour
TD-14	180	100	130	130	Trimmed to a height of 10 ft.
TD- 9	120	65	90	90	
TD- 9	70	40	50	50	

Annual charges

	Int. depreciation	Maintenance	Tracks	Tax and insurance £ s. d.	Fuel and lubrication £ s. d.	Wages £ s. d.	Total £ s. d.
TD-18	300	100	90	4 11 3	436 3 0	670 11 8	1,601 5 11
TD-14	225	80	75	4 11 3	329 4 6	670 11 8	1,384 7 5
TD- 9	175	60	67.10	4 11 3	241 16 0	670 11 8	1,219 8 11
TD- 6	137.10	30	52.0	4 11 3	154 7 6	670 11 8	1,049 10 5

	Costs in pence/ton Coal	Coke	Breeze	Manoxide	Cost/hour s. d.	Remarks
TD-18	.85	1.53	1.19	1.19	17 10	
TD-14	1.06	1.85	1.42	1.42	15 5	Estimated
TD- 9	1.36	2.51	1.81	1.81	13 7	
TD- 6	2.00	3.50	2.80	2.80	11 8	

DOZER-SHOVELS

Tractor	Overall height Bucket raised	Bucket grounded	Dumping height	Bucket capacity	Dozer blade	Working circle
TD-9	12 ft. 4½ in.	8 ft. 1½ in.	7 ft.	1½ cu. yd.	6 ft. 10 in.	30 ft.
TD-9	11 ft. 1 in.	7 ft. 5 in.	7 ft.	1 cu. yd.	6 ft. 10 in.	25 ft.

Performance

Shovelling	Tons per hour Coal	Coke	Breeze	Manoxide	
TD-9	48	27	36	36	
TD-9	32	18	24	24	
Dozing	**Tons per hour**				
	Coal	Coke	Breeze	Manoxide	
TD-9	100	56	75	75	Trimming to height of 8 ft.
TD-6	50	28	37	37	

Costs in pence per ton

Shovelling	Coal	Coke	Breeze	Manoxide
TD-9	3.435	6.1	4.6	4.6
TD-6	4.375	7.78	5.83	5.83
Dozing				
	Coal	Coke	Breeze	Manoxide
TD-9	1.65	2.95	2.2	2.2
TD-6	2.8	5.0	3.78	3.78

The following figures give some indication of the cost involved in running the bulldozer :

		£ s. d.	Per annum £ s. d.
Wages : Driver £7 6 2, Helper 5 11 0			
	£12 17 11 per week		670 11 8
Tax and insurance, 5s. + £4 6 3 = £4 11 3			4 11 3
Fuel oil and lubrication :			
TD-18	2 gal. × 1,800 hours = 3,600 × 2s. 2d. =	390 0 0	
	2½ gal. × 6s. 6d. = 16 3		
	2 lb. × 9d. = 1 6		
	17 9 × 52 ...	46 3 0	
			436 3 0
TD-14	1.5 gal. × 1,800 = 2,700 × 2s. 2d. =	292 10 0	
	2 gal. × 6s. 6d. = 13 0		
	1½ lb. × 9d. = 1 1½		
	14 1½ × 52 =	36 14 6	
			329 4 6
TD-14	1.5 gal. × 1,800 = 2,700 × 2s. 2d. =	292 10 0	
	2 gal. × 6s. 6d. = 13 0		
	1½ lb. × 9d. = 1 1½		
	14 1½ × 52 =	36 14 6	
			329 4 6
TD-9	1.1 gal. × 1,800 = 1,980 × 2s. 2d. =	214 10 0	
	1½ gal. × 6s. 6d. ... 9 9		
	1 lb. × 9d. = 9		
	10 6 × 52 =	27 6 0	
			241 16 0
TD-6	0.7 gal. × 1,800 = 1,260 × 2s. 2d. =	136 10 0	
	1 gal. × 6s. 6d. = 6 6		
	½ gal. × 9d. = 4½		
	6 10½ × 52 =	17 17 6	
			154 7 6

provided they are not less than 7 ft. 6 in. high and 6 ft. 3 in. wide, without removing either blade or bucket and given only 12 ft. of headroom can load coal at an average rate of 32 tons per hour. As a bulldozer it can trim coal at an average rate of 50 tons per hour to a height of 8 ft., or compared with labour, as labour works to-day, the TD-6 is equivalent at these rates of working both as a shovel and as a coal stacker, to the output of 16 men.

These two robust and powerful machines, the bulldozer for trimming, and the dozer-shovel which so easily combines the functions of a stacker and a loader, are but two of the newest of the many types and sizes of mobile equipment available to-day. Engineers have thus a wide range of mobile and stationary machines from which to choose and the widespread use of mechanical equipment, especially mobile equipment in the yard, will do much to lessen our dependence upon labour and alleviate the troubles that have beset the industry in recent years.

DISCUSSION

Mr. **W. Morland Fox** (W. J. Jenkins & Co., Ltd.) said Mr. Harrison was to be congratulated in presenting one of the best short papers on mechanical equipment read for many years, and the Irish Gas Association was to be congratulated on receiving the paper. In very brief compass Mr. Harrison had dealt not only with the mechanical handling equipment of a standard gas-works but also with a new subject or line of thought. He had given some extremely interesting figures of costs, including those of maintenance. These figures, he was certain, would be of much use in their profession. Money spent on manual handling, continued Mr. Fox, was money gone for ever. It could not be salved, nothing could be done with it, so the more capital that could be put into mechanical handling plant the more could be earned. It would also bring about amelioration of labour conditions, which he considered of first importance. There was a shortage of labour in England and also in Ireland. It was his opinion that labour should be used in the best possible way, and that could only be done by mechanization. Their object should be to bring about the maximum change in this way and so release unskilled and semi-skilled labour for more important industries. Capital cost had come into the matter also, and Mr. Harrison had given some figures of handling coal, coke breeze, and oxide. A recent paper by Mr. H. G. Mitchell showed that over the 25 years he based his calculations labourers' wages had risen from 20s. for a 47-hour week to 90s. and the cost of the mechanical handling of coal from railway wagons or ships to the works had been reduced from 6d. to 7d. per ton down to as low as one farthing per ton. Some of the figures given by Mr. Harrison substantiated those of Mr. Mitchell. One of the most important things in designing or modernizing a gas-works was to get the layout properly planned so that the flow of goods was correct. That was the practice in factories throughout the world and deserved some attention in gas undertakings. The coal should come in and flow in a continuous line through the retort houses. The coke should then come out and the two processes should not interfere with each other. In many cases improvement in retort house technique would result in considerable cheapening in the cost of manufacturing gas, but failure to plan properly the handling into and out of the retort house has often wasted the money which was saved in the retort house. In selecting a bulldozer, angledozer, or dozer shovel one of the things to do was to adapt it to as many jobs of work as possible, thereby increasing the efficiency of the tool and making the capital work for the owner all the time. The machine was particularly useful in that it could be transferred from one job to another, and he recommended that one hour per day and Saturday morning be devoted to maintenance. The efficiency of the machine could always be improved by forethought in its maintenance, and this would also obviate breakdown, which almost always came when the engineer was up against it.

If there was one omission in the paper, an omission which he believed was quite deliberate, it was the handling and grading of coke. The President had referred to the necessity for producing first class coke to balance up the two-fuel industry which they served. In the speaker's opinion that could only be done by giving great attention to the quality of the coke which they offered to their consumers. It should be carefully graded and of consistent size and quality. He again offered his congratulations to Mr. Harrison. It was, he understood, his first paper to the Association, and they would look forward to getting many more interesting papers from him.

Mr. **T. C. Battersby** (Watford and St. Albans Gas Company) having also offered his congratulations to the lecturer said the Le Fleuve conveyor was a very cheap method of getting hot coke from the retort houses, giving excellent service with very low maintenance costs. He was rather surprised, having regard to the drive for mechanization which was obvious, that the labour figures per million seemed rather high. He himself had experience of water gas plants making up to 3 mill. cu.ft. per day where only two men were used per shift, and in horizontal retorts of 2 or 3 mill. with about 12 men per shift. He could well understand Mr. Harrison's admiration for the bulldozer, and congratulated him on having one. There were very few gas undertakings in England with bulldozers and many of them were anxious to get them when they were available. With regard to the stacking of coke, he said many of them in England did so by motor vehicle, and even under those conditions they had an increase in breeze content. Then there was the question of the disposal of the breeze. After grading and screening they were still left with a pile and wondered what to do with it. He agreed entirely with Mr. Harrison that the band conveyor was possibly the most attractive proposition. Such conveyors were very easy to operate even if they did require much more ground space than the gravity bucket conveyor. In the latter maintenance was always a serious factor. He found it rather difficult to compare costs, which seemed rather lower in Ireland than they were accustomed to in England. In the two countries they probably had the same urge and drive to eliminate labour as far as possible in every operation and to mechanize the works from the incoming coal to the grading and loading of coke for the consumer.

Mr. **F. H. Thomas** (Limerick) said he happened to be one of the fortunate ones about to embark on the erection of a new gas-works, and the information contained in the paper would be of tremendous importance to him. In Limerick they had a mobile shovel which they found invaluable, and they were about to get another one. The reaction of the men themselves to the use of the shovel was very favourable because the machine was doing work which the men themselves did not like to do.

Mr. **Norman J. Robertson** (General Manager, Alliance and Dublin Consumers' Gas Company) gave his unqualified support and approval to the methods outlined by Mr. Harrison. Emphasis should be laid on their effect of reducing labour costs and increasing efficiency. The paper was indicative of the effort that should be applied to-day. It was an approach to those problems with which they were all faced, and also the only possible method by which they could reduce costs.

In conveying the vote of thanks to Mr. Harrison the **President** said the paper set them a new standard in the transactions of the Association.

NEWS FROM NORTH MIDDLESEX

For those who remember the work planning system devised by Mr. H. R. Hart, Sales Manager of the North Middlesex Gas Company, and described by him in a paper to the London Juniors, and the appliance and consumer surveys conducted by his Company, it will not come as a surprise to learn that another scheme is in operation. The latest methodical and interesting approach to the problems of the sales and service section is the evolution of a domestic appliance service scheme which is designed to give a regular periodic service at a fixed price to any domestic appliance. The scheme owes much to an excellent paper prepared by a Sub-Committee of the North London District Salesmen's Circle last year under the Chairmanship of Mr. Hart. "Maintenance Cost Recovery," as the paper was called, dealt in detailed fashion with maintenance requirements and envisaged a practicable and flexible scheme founded on a co-ordinated liaison between all departments concerned with consumer service and embodied in a central control. The paper favoured maintenance cost recovery by its inclusion in the thermal cost of gas; of recovery by contract it stated: "... In the past, consumers have been apathetic towards this method, reasoning that appliance service is an obligation of the undertaking which is freely given ... A serious drawback of the contract system is the implied policy —unintentional though it may be—'We can give you maintenance, at a price,' knowing that the withholding of service is not in keeping with the theme ever being presented to the public." In spite of this, the contract recovery method was the one chosen by the North Middlesex Company as being the most practical. The scheme applies only to consumers' appliances, and although it was introduced only a short while ago, the response has been very satisfactory. Servicing is carried out at the following intervals: cookers, fires, bath water heaters, multipoint storage heaters, circulators, radiators, and wash boilers and washing machines, 12 months; sink water heaters, multipoint instantaneous water heaters, refrigerators, and certain gas-fired boilers, 8 months; boiling water heaters, 6 months. Although water heaters are dismantled and thoroughly tested and overhauled, the maintenance charge does not include descaling, which, owing to its uncertain nature, is regarded as an extra. The charges per appliance are reduced by 9d. for all except the first, when more than one appliance on the same premises can be attended to at one visit.

A very different and more familiar scheme is that adopted by the Company to assist in the promotion of good relations between employer and employees by providing a holiday camp for apprentices. Started in 1946, the "Midgas Boy's Holiday Camp," as it was christened, was a great success, offering a week of swimming, cricket, football, &c., to a number of lads at Little Farthingloe, Dover. This year the camp was held at Hastings, over 30 boys attending. Of this number, a few came from the Barnet, Slough, and Uxbridge, and, as before, parents visited the camp at the invitation of the Company.

HIGH PRESSURE GAS DISTRIBUTION SCHEME AT CORK*

By J. J. O'MAHONY, B.E.
Assistant Distribution Engineer, Cork Gas Consumers' Company

THE following is a brief account of the reasons which led to the installation of high-pressure feeder mains at Cork, the work carried out and the plant used.

In the year 1910 the total annual output was 272 mill. cu.ft. and the probable maximum peak load flow was 100,000 cu.ft. per hour. In 1945 the annual output was 550 mill. cu.ft., and the maximum peak load flow obtained by a pilot tube reading was 350,000 cu.ft. per hour, which was 3½ times that of 1910.

The trunk mains from the works and through the centre of the city are, generally speaking, the same as in 1910, but the total mileage of mains was very much increased and the limit of supply had in some cases extended 3 miles farther from the works. In addition, new housing sites were being opened up around the perimeter of the existing mains, and it was seen that the demand for gas in these areas would be very heavy and could not be met by the distribution system as it stood.

Calorific Value Reduced

During the recent war the calorific value of the gas had to be reduced from 500 B.Th.U. to 400 B.Th.U., and the hours of supply were restricted to 2 hours during the midday period, which meant a larger peak load flow in cu.ft. per hour. Pressure recordings were taken during this period in various districts which revealed pressures at some extreme limits as low as five-tenths (½ in. W.G.) and in one case even lower at the peak of the dinner hour load. This position was very disturbing and something had to be done as soon as possible to give satisfactory pressures to all consumers at all times and to enable the Company to take on extra consumers on the outskirts of the city.

The following methods of dealing with the problem were considered by the Company's Distribution Engineers:

(1) Laying of new trunk mains from the works or enlarging existing trunk mains.
(2) Converting some of the existing trunk mains to medium pressure mains
(3) Erection of district holders.
(4) The construction of a high pressure main and feeding through district governors into the existing low pressure mains at selected points.

Having given full consideration to points such as disturbance to consumers, underground obstructions, maintenance and future developments, it was decided to recommend the construction of a high-pressure main.

Flow readings were taken at various points, consultations were held with the various public authorities with a view to getting an idea of the future house building schemes and the existing and future peak loads to be carried by the high-pressure main were estimated. Giving full consideration to capital cost, running costs, &c., the sizes of mains were calculated.

It was proposed to do the job over a period of years by running radial mains. The first of these would run to the northern side of the city, but when the costing was investigated it was found that this main would have to cross the River Lee at two points. This would have entailed two expensive coffer dams as there was no room over adjacent bridges which were fully occupied by existing mains, cables, &c., or were swing bridges to allow shipping to pass. Each coffer dam would cost approximately £7,000 (£14,000 in all), and in addition a portion of the main would pass through the centre of the city where reinstatement costs of surfaces would be very high, as considerable stretches were mastic asphalt on concrete. Also, due to the various underground works, the main would at some points have to be laid at a depth of at least 7 ft. and this would have necessitated shuttering and pumping of trenches due to the flat of the city being tidal a few feet below the street surfaces.

Messrs. E. E. Jeavons & Co., Tipton, Staffs, were appointed by the Company as consulting contractors and Mr. E. E. Jeavons, M.I.C.E., suggested to the Directors of the Gas Company that the idea of radiating high-pressure mains be abandoned, and to consider doing the complete job in one year by running a high-pressure main south from the works and encircling the city with district governor stations constructed at suitable points on the perimeter. The south-eastern districts, Blackrock and Douglas, were to be fed by a radial main taken off the ring main. A careful site survey was carried out and the following advantages became obvious:

(1) Two narrow crossings of the River Lee could be made further upstream where there was room and cover over two masonry bridges, obviating coffer dam construction.
(2) The streets along the route were less expensively paved, had fewer underground obstructions and carried comparatively little traffic. In addition there were long stretches where grass land and unpaved surfaces with no obstructions allowed of cheaper main-laying.

An approximate cost of this scheme was placed before the Directors, who decided in favour of the ring main in July, 1946, and after further discussions decided to carry out the mainlaying by contract rather than by direct labour.

The proposed route of the main was, in places, through private property, and the sites for the district governor stations were in all cases privately owned, so that negotiations for wayleaves, &c., had to be made. Some of these were very slow and difficult, but all were eventually settled. During this time orders were placed for plant and materials, all items being carefully scheduled and checked. Messrs. E. E. Jeavons & Co., Ltd., acted as British agents for the Company and were in constant touch with the various firms, who had received orders, to ensure that once the job had commenced there would be no serious hold-up due to non-delivery of materials.

Contract Signed

Towards the end of September, 1946, a contract was signed between the Company and the South of Ireland Asphalt Company for the excavation, pipelaying, testing, filling in, temporary and permanent reinstatements of surfaces, all the pipes and specials to be supplied by the gas company. The rate of laying was specified at 600 yards per week, each section of approximately 300 yards to be tested at 50 lb. per sq. in. air pressure before being filled in. A minimum cover of 2 ft. on top of sockets of pipes was specified and the pipes had to be laid to a gradient of 1 in. in 10 ft. towards or from a syphon. Isolating valves to be fitted in the line of the main at intervals of one mile approximately and the work was to commence on Feb. 3, 1947.

Progress.—A resident engineer of Messrs. E. E. Jeavons & Company's staff arrived in Cork at the end of January, 1947, to supervise the contractors, &c., and the following are taken from his progress reports.

Progress Report No. 1 (Feb. 8, 1947).—(Excerpt.) The contractor commenced operations on Feb. 3, 1947 (according to schedule) and piloted along Carrigeen Park Road at the commencement of the 10 in. main. It was found possible to lay the main about 2 ft. from the kerb, and the trench was set out and scarified with a steam roller. Excavation commenced on Feb. 4, and boulder rocks were found in the first 50 yards. A compressor arrived and has been working for the remainder of the week. A heavy fall of snow caused delay, but pipelaying should commence on Feb. 11, and I see no reason why good progress should not be maintained.

Progress Report No. 2 (Feb. 15, 1947).—(Excerpt.) Mainlaying actually commenced on Feb. 12, 1947, and eight pipes were laid. On the 13th a further 10 pipes were laid and jointed. By Feb. 15 the contractor was all set for a good straight run and it is hoped to have the first air pressure test on the 17th (weather frosty).

Progress Report No. 3 (Feb. 22, 1947.).—(Excerpt.) The main-laying gang has made much better progress this week, having laid 260 yards (including carrying out 3 air test). The test disclosed several faults, which were rectified after much trouble.

It will be noted that for the first few weeks the rate of mainlaying was below that called for in the contract, but after a short time the contractor had three gangs at work and the rate rose during some weeks to 800 yards. The ring main around the city was completed and passed the final test towards the end of September, 1947.

At this time a contract to lay the branch 6 in. high-pressure main, off the ring main, to Blackrock and Douglas was signed with Messrs. E. Barrett & Sons, Cork. This main was not finished and tested until the beginning of April, 1948, the delay being due to the non-delivery of some 200 yards of pipe. A 12 in. welded steel overhead main was run from the compressors and connected up to the cast iron at the boundary wall of the works and the high-pressure main was purged by May 3, 1948.

The 10 district governors were fully serviced and adjusted under the supervision of the manufacturers and the scheme was in operation for May 6, 1948, some 15 months from the commencement of the mainlaying. At present it is only necessary to compress to 2 lb. per sq. in. at the works and the duration is 3 hours per day, but a comparison of district pressure charts before and after the scheme immediately shows the improvements which have followed the installation. Unfortunately, up to the time of writing this paper the meter has not been installed and there are no records of what is passed through the high-pressure main per hour.

*Paper presented at the Annual General Meeting of the Irish Gas Association at Cork on Sept. 14, 1948.

Plant Used

(1) Pipes.—It was decided to use for the underground high-pressure mains spun pipes to class B.B.S.S., the specials to the same standard, both pipes and specials coated outside only and to have flexible joints. Messrs. Staveley Coal and Iron Company's bolt type flex joints were principally used, but quite a quantity of Messrs. Stanton Ironworks' screwed gland joints were also used.

The overhead steel main supplied by Messrs. Stewarts & Lloyds, Ltd., was with long sleeve joints for welding, expansion being taken care of by Johnson couplings. The welding was done by a welder of Messrs. E. E. Jeavons & Co.

The length of mains:

	Yards
12 in. steel	160
12 in. cast iron..	279
10 in. cast iron..	10,886
8 in. cast iron..	3,782
6 in. cast iron..	3,212

making a total of nearly 10½ miles.

Valves.—These were of the high pressure type made by Messrs. Westwood & Wrights.

(2) Compressors.—Duplicate sets of compressors were obtained from Messrs. Geo Waller & Son, Ltd., one steam driven and the other electrically driven. Each has a maximum output of 200,000 cu.ft. per hour at 20 lb. per sq. in. The steam set is a two crank compound superimposed vertical enclosed compressor. The steam cylinders are 14 in. and 20 in. bore by 10 in. stroke and the compressor cylinders 27 in. bore by 10 in. stroke, the steam consumption being 30 lb. per B.H.P. per hour on full load. The motor-driven set is also a two crank vertical enclosed type compressor of the same stroke and bore as the steam-driven set. The motor is a Laurence Scott screen protected N.S. type variable speed rated to develop 290 B.H.P. at 1,250 r.p.m., and capable of infinite speed variations down to 145 B.H.P. at 625 r.p.m.

(3) Meter.—A 16 in. by 48 in. Holmes Connersville meter with by-pass is being installed on the inlet to the compressors. It has an indicating and recording tachograph which shows the flow through the meter at any time and gives on a chart the record of flow at all times. A P.V.T.T. recording instrument is also fitted to give a condensed record of pressure, volume and temperature of the gas passed.

(4) District Governors.—These are all fixed overground in houses built of concrete blocks with a concrete roof, the exterior being finished to conform with the buildings in the vicinity. The houses are of ample size to allow men to work in comfort and each contains a duplicate set of governors with dust traps, and are the manufacture of the Jeavons Engineering Company.

It will be seen from the ordnance sheet that though the high-pressure main around the city has been called a "ring main" actually it does not return to the works, but provision has been made that at any future date this can be done without interrupting the supply carried by the existing high-pressure main. When eventually the "ring" is completed the isolating valves will enable any section of the ring to be shut down in an emergency and gas supplied to the other sections in either direction. A number of houses, which previously could not have a gas supply are now being fed directly off the high-pressure main through service governors.

The whole scheme is working perfectly, the results being all that were anticipated and ample provision has been made to cope with the increased loads which are expected. The worry of inadequate district pressures has been completely removed and is not likely to arise for many years.

In conclusion, I would like to express my thanks to my Directors for permission to read this paper, and to Mr. E. E. Jeavons, M.I.C.E., and the various contractors for their help and the attention given to the contracts.

DISCUSSION

Mr. **F. H. Thomas** (Limerick) congratulated Mr. O'Mahony on his paper, which, he said, was of more than academic interest. At the same time he congratulated the Directors of the Cork Gas Company for their confidence in the future in carrying out a scheme of such magnitude. It was a good augury that they as business men should have such confidence in gas for the future. It was not uncommon to find gas managers going all out to improve their works, but they often found that a man who had made a really good job of his works forgot that he had a district. In many gas-works distribution had been a secondary consideration and the sales of gas had suffered enormously. A study of distribution problems would repay any manager. They in Limerick had decided to go ahead with a major reconstruction of their gas undertakings, the erection of new works, and the reconstruction of the distribution system. They had now laid about seven miles of mains and already they had found a very substantial increase in their output.

Mr. **T. C. Battersby** (Watford and St. Albans Gas Company) congratulated Mr. O'Mahony on his interesting paper and on the full way in which he had gone into the scheme. It was a scheme in which there was no question of hit and miss; each problem had to be considered very carefully on its merits. He was particularly interested because in his own undertaking they were presented with several substantial mainlaying problems in so far as they had to provide gas to four satellite towns as they were being built. However, in some respects that was a simpler problem than the overcoming of difficulties in an area which had become over-developed. His Company had also had to concern itself with the problem of radial mains and ring mains. In some cases they found it advisable to lay radial mains and in other cases ring mains. He would like to know why Mr. O'Mahony selected cast iron mains—he assumed there were in Ireland corrosion problems such as they had in England. Then there was the matter of expansion joints. He recalled that with the first steel main they laid for a distance of 12 miles they inserted expansion joints but they found that those joints were a source of probable leakage. On subsequent schemes they abandoned the idea and the whole main was laid rigidly. Mr. O'Mahony has also mentioned dust traps and expected them to last for a period up to six months. It depended on the gas that was being distributed as to how long the traps would run without being emptied. In a reference to the high pressure system, Mr. Battersby said when they first thought of it they thought only in terms of steel mains, but during the war, when steel was unobtainable, they did use cast iron and they had no complaints to make about it. He would like to know the total cost of the Cork scheme and the additional volume of gas distributed. Another point made by Mr. Battersby was that nowadays consumers seemed rather to expect that gas pressure would drop at certain times during the week, and speaking for his own Company he said they had the utmost difficulty in getting their customers to register their complaints about low pressure. They had adequate showrooms and still the consumer thought that a drop in pressure was natural on Sundays. All gas engineers were expecting a rapid increase in sales; the demand for gas was enormous and they were having difficulty in meeting that demand.

Mr. **W. Morland Fox** (W.J. Jenkins & Co.,Ltd.) asked Mr. O'Mahony which of the two compressors, the electric or the steam, was being used, and why the choice was made. Was the steam engine condensing or non-condensing, and what was the actual testing pressure?

Mr. **T. P. Travers** (Director and Distribution Engineer, Cork Gas Company) expressed the pleasure of the Board with Mr. O'Mahony's work on the scheme, which involved the collection of an enormous amount of data. The position in Cork was that if they had not gone on with the scheme they would have had to refuse any more consumers. Now they were taking on additional consumers and they were quite complacent about the prospect of large municipal housing schemes with their great demand for gas.

Mr. **P. J. McEvoy** (Midleton) said the Cork Gas Company had shown an extraordinary example of initiative and enterprise, and faith in the future of gas in Ireland. They were a stimulating influence on smaller undertakings. There was a great future for gas, but the work at the gas-works proper was no good unless it was backed up by a good distribution system.

Mr. **O'Mahony**, replying, said the new scheme had definitely led to increased consumption, and in every case where they had increased pressure they found that the consumers had used more gas. That pointed to the fact that if the consumer could get good pressure and a constant quality of gas he would use more gas. Roughly speaking, the cost of the scheme was £70,000. From their experience they had no doubt of the lasting qualities of cast iron mains. They had no experience of how long steel mains would last, and at the present time cast iron mains were cheaper. With regard to expansion joints, the steel main they had was overground. There were two or three expansion joints in it. As to the dust traps, they had had the scheme in operation only since last May, and they depended on the works to see that the gas sent out was clean. In regard to the compressor sets, they were at the moment using the steam set because the Electricity Board had not yet delivered the transformer they required. Eventually he thought the steam set would be the standby. At the moment the steam set was non-condensing, but they were putting in a feed water heater at a later date.

The vote of thanks to Mr. O'Mahony was carried with acclamation.

WICKLOW STOKERS' CLAIM

A suggestion that the price of gas in Wicklow should be increased if the present price did not permit adequate wages for the employees of Wicklow District Gas Company was made to the Eire Labour Court, when two stokers claimed an increase of 11s. weekly, and a fitter an increase of 36s. weekly to bring wages up to the district rate.

Mr. G. Anderson, Managing Director, said that the price was the minimum allowed by the Prices Commission, but the Company had not sought any increase in the past two years because they felt that the price was already too high. The Company had lost money in the last two and a half years and, turning the corner last year, had made £10 profit in 1947. That position had been reversed again and the position was now parlous. Unless they could rely upon building up a retail coal trade, they could see no hope of carrying on.

The Court decided to discuss the position with each side separately and to announce its findings later.

IMPROVED RESULTS AT GLASGOW

The 79th annual report and accounts of the Glasgow Gas Department covering the year ended May 31 show a gross revenue of £3,549,765, compared with £3,257,908 for the previous year, and a gross expenditure of £3,340,807, against £3,138,677, leaving a credit balance to be carried to profit and loss account of £208,958, against £119,231. Interest and sinking fund charges absorbed £156,416, against £148,364, leaving a surplus on the year's operations of £52,542, compared with a deficit last year of £29,133. A deficit of £16,394 was converted to a surplus of £36,148.

Gas delivered and accounted for during the year amounted to 12,674,245,147 cu.ft., an increase of 3.01% over the preceding year. Unaccounted-for gas was reduced from 7.81% to 5.1%. The maximum day's send-out was 45,089,000 cu.ft., and the highest daily make was 45,985,000 cu.ft. Coke oven gas purchased during the year was 2,735,611,000 cu.ft. after purification, and the quantity of water gas made was 1,580,729,000 cu.ft.

Coal carbonized amounted to 565,245 tons, a decrease of 12,585 tons, and the average cost was 52s. 1.784d. per ton, or 5s. 1.869d. more than in the previous year. Coal gas made per ton of coal carbonized was 15,991 cu.ft., which, with water gas, gave an average of 18,788 cu.ft., compared with 15,087 cu.ft., and 18.533 cu.ft. respectively per ton for the previous year.

Referring to the chemical works, the report states that the difficult position reported last year in connexion with burnt lime and soda ash still continues, but not in so aggravated a form; this is reflected in the amount of tar acids which it has been possible to extract from creosote. Demand for road tar and tar-bitumen mixtures is increasing and present deliveries are greater than during the last three or four years. Accumulated stocks of crude tar enabled the Department to participate in the higher priced export pitch market and the American creosote market; this was effected without diminishing stocks unduly or interfering with home market demands which were fully met.

Services in New Houses

More than 2,400 permanent and 1,200 temporary houses were connected to the supply mains during the year, and work on mains necessary to supply gas to new factories at industrial estates was carried out at Carntyne, Queenslie, North Cardonald, and Hillington. A new 18 in. high pressure trunk main was completed, except for a portion on a railway bridge, with very satisfactory results to consumers in the Netherlee, Stamperland, and Clarkston areas. Mains now represent a total of 1,585 miles.

Work on provision of meters and piping for housing developments, both permanent and temporary, kept abreast of the building programme, but following the drastic limitation of steel allocated for the use of the gas industry the Department experienced considerable difficulty in the fitting of appliances for individual consumers. Output of cookers showed some improvement through increased supplies of components, and the requirements of new houses and other essential needs were met. Appliance sales were satisfactory and the delivery of equipment was very good.

Notable events at the central showrooms during the year were the Danish Design Exhibition arranged in conjunction with the Arts Council of Great Britain, and the Infra-Red Heating Exhibition arranged by the Scottish Gas Development Centre. The latter is described in the report as one of the most successful ever held in Scotland, and was attended by over 6,000 visitors. The Industrial Heating Section is very fully engaged and the field of work is very wide and varied. The service given by gas during the war is appreciated and is now being applied to peacetime industries.

The number of meters in use at May 31 was 345,448, an increase of 2,366 on the year. Ordinary type meters showed an increase of 1,341 and prepayment meters an increase of 1,025. Appliances on hire and free loan comprised: Cookers and range fittings, 189,246; grills, 13,683; boiling burners, 31,947; gas fires on hire, 6,723; radiators on hire, 3,597; water heating appliances on hire, 542—a total of 245,738, compared with 250,001 for the preceding year.

GAS HEATING IN DUBLIN

Central heating by gas in Dublin houses is becoming more popular. The Alliance and Dublin Consumers' Gas Company are about to install three plants in newly-built homes. Between 20 and 30 applications have been made for heating apparatus, and orders will be completed before the end of October. The work is subject to slight delay because the plant has to be assembled by hand and delivery is not so rapid as in the case of mass-produced equipment. The cost is £60 or £70.

The Company is now installing about 250 new cookers a week, of which about 70 are replacements for old models. This shows more than a 50% increase on the rate of installation before the war. No difficulty is experienced in meeting demands. The Company is taking the complete monthly output of one English factory and much of the output of others. The cookers are assembled in Dublin to avoid the duty imposed on assembled imported articles.

A SNAG IN GAS ANALYSIS

By "GAS CHEMIST"

The experience described below illustrates the need for caution and intelligence in carrying out a simple routine job, where an error of the nature indicated might have serious consequences.

A young and inexperienced junior chemist was asked to make an Orsat analysis of the flue gas passing from a range of retorts along the main waste-gas flue to the waste heat boiler. He reported his result as giving 9% of carbon monoxide and a correspondingly low figure for CO_2. As the setting was known to be reasonable well supplied with secondary air, and the retort temperatures were reasonably good, surprise was expressed at this extraordinary figure for CO, particularly as this represented the average from 20 working retorts.

If this were the average, some of the flues discharging into the main duct should contain much more even than this quantity.

Apart from gross waste of fuel, any indrawal of air at a later stage would result in serious overheating and almost certain damage to the refractories. The senior chemist under whose charge the junior was working was naturally not a little concerned; either there was some mistake in the analysis (or the sampling), or else there was a serious shortage of secondary air or over-production of producer gas above that required to heat the setting. In any case, prompt measures were necessary.

Check tests on samples taken from the same sampling position, and at other positions in the flue gave substantially the same figures. In all cases, the CO_2 figure was low, there was complete absence of oxygen and the CO varied from 8% to 9%.

In spite of this analysis, experience led to the belief that the air supply with the conditions prevailing ought to be sufficient to burn all the producer gas; in fact, it was anticipated that too much air would be found as a result of the test. The retort house superintendent practically settled the question by throwing a few pellets of pitch into the flue, when they were seen to burn completely with a bright flash and a smoky flame. From this result, the presence of excess oxygen and, consequently, the absence of carbon monoxide was argued.

Close investigation of the method of analysis and examination of the Orsat apparatus revealed the fact that the chemist, aware of the necessity of using a freshly prepared solution of cuprous chloride for absorbing the carbon monoxide, had overlooked the necessity for maintaining a fresh supply of alkaline pyrogallol for the oxygen absorption, and had, apparently forgotten that, although pyro does not absorb carbon monoxide, cuprous chloride will absorb oxygen, and that any oxygen escaping absorption by the stale pyro (which, in this case, was completely spent) would be taken up by the cuprous chloride and returned in the analysis as CO. This is, in fact, what had been happening. The low CO_2 figure was a correct one. The figure for carbon monoxide represented, not CO, but oxygen, and the sample, far from indicating the deficiency of air to the setting contained the latter in considerable excess.

The moral is obvious!

GAINSBOROUGH'S NEW COKE PLANT

Gainsborough Gas Department's new £7,000 coke grading and storing plant, officially opened on Aug. 28 by the Chairman of the Gas Committee, Councillor E. W. Wood, was built by W. J. Jenkins & Co., Ltd., of Retford, Notts., under the supervision of the Council's Gas Engineer and Manager, Mr. E. Shackleton.

The Council believes that the installation of this plant will be welcomed by the coal and coke merchants, whose only means of obtaining graded coke previously was to buy railway truck-loads and transfer the coke by shovel into lorry loads or bags. The new plant provides speedier and simpler loading, whether into lorries or bags. All Gainsborough's coke is made from South Yorkshire screened gas nuts. The grading plant consists of a receiving hopper, rotary feeder, spaced bucket elevator, grading screen, and storage bunkers with bulk loading and bagging chutes. The coke is delivered from the retort house in bogies to the receiving hopper, situated at yard level, from which it flows by gravity to a rotary feeder which delivers it to the elevator buckets. The buckets run at approximately 100 ft. per minute, and the elevator can deal with seven to eight tons of retor coke per hour.

Coke is deliver.d to the grading screen via a tile-lined steel chute. The screens are the "Jenkins" improved single-deck reciprocating type designed to grade coke into four sizes for storage in the bunkers situated immediately below. Screens and elevator are driven through belt, chain and spur gears from an extension shaft coupled direct to a 10 h.p. continuously rated slip ring gas-works type motor. After leaving the screens the graded coke is stored in the steel-framed brick-panelled bunker, the four compartments of which have a total capacity of 40 tons. Four bulk loading chutes with a radial type cut-off doors are provided for the direct filling of road vehicles on one side and four chutes with hand operated slide doors are provided for bag filling at yard level. All the chutes are tile lined where necessary.

A steel-framed sheeted housing, with adequate roof lighting and easy-to-clean windows, is provided over the coke grading plant.

THE THORNCLIFFE EXPERIMENT*

By SIR HAROLD WEST,

Managing Director, Newton Chambers & Co., Ltd.

I BELIEVE in the quality and spirit of the young men of to-day, and at times I vehemently defend them. I feel they are not to blame for not measuring up to our requirements; rather, it is we who are to blame for not properly interpreting our needs to the spirit of youth. I remember some time ago hearing a speaker quoting from a letter. The burden of the quotation was that young men are not to-day what they used to be. The speaker then produced a photograph of the quotation which was an inscription found on a stone in the Nile valley. It was a letter written long generations ago by one Assyrian to another. Apparently the same thing is said in every age—that young men are not what they used to be.

I feel personally that it is for us who are in industry to give a lead in this matter. We should interpret our requirements to the spirit of youth, and, if possible, through youth. Whether it be a firm, an individual, an institution, or a department, we should surround ourselves with young people so that we may witness the development of that buoyancy, enthusiasm, and optimism which we lack when we get older. When we get to the fifties and sixties we begin to commiserate with each other on what cannot be done to-day and on what should have been done yesterday.

Recently I read a paper with rather a good title, "The Fruits of Frustration," and I found it had a good deal to say about the absence of that pioneering spirit for which this country was once so famous. It stressed the fact that opportunity never comes without being accompanied by difficulties. This is a pessimistic spirit, the spirit which causes one to say that the glass is half-empty instead of saying that it is half-full. There are two ways of saying the same thing.

When I came to consider this address, I thought first of tradition and background, and then I thought of what we are trying to do. I felt that while a great deal of detail would be superfluous, I had something to say which would be of interest even to those in small undertakings. We are all, at some time or another, dealing with young people. Some of our ideas have been proved useful and others we have discarded. In any case, there should be something of value to you all.

Why have I chosen this title—"The Thorncliffe Experiment in Industrial Co-operation"? Very often, after a speaker has given the title of his address, the audience waits and watches for the moment when he is going to advertise himself or his firm. I have taken this title so that you may not have to do that. I chose the title deliberately because this is something about my own Company and myself.

Learning by One's Mistakes

Experience has shown that when people are really interested it is wise to disclose both failures and successes. If all experimental failures were disclosed it would save a great deal of unnecessary work. We have had many failures in this experiment and I shall tell you of some of them. We have had many successes, but the story of the failures is perhaps even more helpful than that of the successes. After five years' experience we now know a great deal more about this problem of enlisting and training youth than perhaps many others do. We have had the advantage of a rather diverse and composite undertaking, employing some 4,000 men, some of them displaced persons. As Managing Director I have to deal with the colliery side of our business. Our Company supplies Sheffield with one-fifth of her gas, in addition, we have ironworks, foundries, structural engineering works, chemical works, and paper works. With such a composite and varied undertaking we naturally get a broad picture and a good cross-section of industry. I have had 30 years' experience, in different branches, including the lean and difficult years of 1926 to 1936, and I am still tremendously impressed with the value and importance of efficient and sincere leadership and management. I have seen a good deal of management training in the United States of America, and when one sees how much is being done there in connexion with the science and art of management, one is concerned to find how little training is being given along these lines in our own country. Take Columbia University, for example. They have there in their business management department a faculty of 80. We must remember that it is the men who have been trained over there that we shall be up against in Europe and other parts of the world in the next few years. It is not enough to say that the British character will suffice to get it over. We need more than that. Efficient and sincere leadership of men is an essential requirement to-day, and in many branches of Government service also.

Misguided Energy

What drew me first into this business of industrial co-operation (someone has called it a "racket") was the spectacle of men leaving the works and showing so much natural energy after they had left. On a Saturday afternoon or a summer evening they seemed to be able to exert themselves as they were never able to do in the works. In their walk home for lunch or in the evening there was a stride and a spring never visible during the working hours. When they played any game they threw themselves into it. There was no money incentive; all that urged them on was the desire to excel, to find a place in the team. I began to wonder how we could get that spirit into industry. Why was it that a man was ready to throw himself into a game yet was not prepared to throw himself into his work? That is a thought on which we should dwell. It is a question which I have put to many people.

Let me tell you something about our apprentices' strike. One day there gathered outside our general offices a most unusual mass of some 400 young fellows under 21 years of age. They had been coached by Communist leaders, and were smiling and evidently enjoying most thoroughly their first strike. They insisted on seeing the Managing Director. At the time I was busy at a meeting, but the commissionaire said, "You had better come, sir; they will come into the room if you don't come out." "What can you do about it?" I asked. "Not very much, sir, they're big fellows."

There was a deputation of seven and they brought their arguments before me. They were striking because the girls were getting 2s. a week more than boys of the same age. In both cases we were paying the approved rates, one fixed by the Engineering Employers' Federation with the A.E.U., and the other the girls' rates approved by the Ministry of Labour. The trouble was that the girls had offered to take the boys out to the pictures in the evening, and this was serious. The Communists had taken the matter up and enlarged on it, and the trade union said the boys had it in their own hands and would do nothing. At that time all the collieries were finding that they could do nothing with boys in the pits; nobody could make out where the trouble was coming from. The trade union admitted it could do nothing for the youth, and the shop steward was then a comparative innovation. He had not yet settled into his job and at the time was busy exploiting his nuisance value with a view to getting votes at the next election. It is important to realize that the shop stewards must exploit that nuisance value and the only safe thing is to have the elections every three years.

Leaving a Taste in the Mouth

When we thought we were reasonably efficient we complained; we were competing for orders but not for men. The whole work seemed to be well organized, efficiency was high, and there seemed no cause for worry until one sensed the troubles and discussions that were going on underneath. We were efficient in our labour negotiations, we were winning most of our arguments, but we were leaving a taste in the mouth of the man who objected to being beaten on sheer argument.

We turned then to our Production Committees of which there were 14, all working well, and each with three managers and three workmen. There was a Production Council on which each Committee was represented, and which met once a month with myself in the chair. After five years it is still meeting regularly every month and working satisfactorily. In the Company, of course, we had a fine background of tradition; we happen to be 150 years old and 40% of the men have been there for more than two generations. If you analyze your labour corps you will find that 50% are moving round, and that is the body we must deal with. We have generations of miners, generations of moulders, generations of engineers. We have a good welfare organization. We are as proud of it as most people and we often discuss welfare matters in the board room. We thought

* From the address to the North British Association of Gas Managers, Sept. 9.

we were going well, yet we were not touching this problem of the young people.

The story is told of an Italian beggar who said that he liked the English but he hated the manner in which they threw their money at him. In the same way there are firms who tell me that they have done this, that, and the other thing for their workers. They have given them canteens where they can get a first class lunch for a shilling, they have provided every facility, and yet the men are not content. Welfare schemes put out to nurse will never get anywhere.

Shortage of Young People

Young people are in terribly short supply. It has even been said that in 70 years there will be no young population left in the Highlands. We are losing the young people and, of course, we lost them for a whole year when the school-leaving age was raised. We have to compete and it is no good competing in the old way. It is no good expecting these young people to respond to the call and incentive of "getting on." I have dealt with at least 600-800 apprentices and I find that for 80% of them the incentive of "getting on" has no appeal. About 5% are influenced by ambition; another 5% are influenced by the urge from their parents plus a little ambition; but 80% are not interested in the prizes which we offer in the shape of certificates and the like. We have to build up that desire to attain and achieve.

A few months ago I was at a miners' school. They wanted more cultural facilities in the village. We discussed it for some time and I asked on what grounds they considered themselves representative of the whole, pointing out that if they were representative of the 60,000 miners they were professing to represent they would not have been there. Ambitious men would never have been there. I told them to get 500 miners they knew and ask them how many of them wanted cultural facilities in the district. I have not time to develop this argument, but it is interesting to consider to what extent we are representative of the mass.

I find that 70% of the young people who leave the elementary schools want interesting routine work, work that does not call for much in the way of night schools and evening study. They are prepared to work hard in the day time so long as they have the evenings to themselves. We have to win them over to other ideas and it is no good assuming that they will be influenced by incentives or spurred on merely by ambition.

A manager I had at a miners' training school had a photograph of every man doing his own particular job in the pit; there are 35 different jobs and the manager had a photo of each. But a boy once pointed out to me, "There is only one manager; what is the chance, my chance, of rising and getting that man's job?" We must give the majority something other than the incentive to achieve managerial responsibility.

Introduction by Influence

Regarding our procedure in dealing with the intake of young boys I need say little. You all know how most young people are introduced to industry to-day. Mother knows the manager and father is told to go along and see him because our John is ready to leave school and start work next week. Mother knows the manager in the moulding shop so John becomes a moulder, or father knows a foreman in the joinery shop and John becomes a joiner. The boy is pulled in full of suspicion. You can all cast your own minds back to the first day you spent in industry. You did not know where the next blow was coming from. If you can take the lad and convince him that it is good fun he will appreciate it. It is worth doing during his first week or fortnight in industry, perhaps the most impressionable period of his whole life. There is a great opportunity there.

The boy gets an interview, and you talk to him and try to find out what he wants to be. You have to open up a picture before him, a picture of the foundry or the fitting shop or whatever it is. You have before you an idea of the likely vacancies for some time to come and you tell the boy to report on a given day. He finds that other boys have been told to do the same. They come in and immediately they are put through a preparatory course. For a month he surveys the firm in its entirety, going from one department to another. It is an interesting experience for the manager. He has to be very quick, because he has a critical audience. The boys ask him many questions and he has to be very careful because later on he may find one of these boys in his department and be reminded that things are not as he said they were. A good manager, of course, will want to boast of his own department.

The day's programme for the boys commences at 8.30 a.m. with inspection to see that their hair, hands, faces, and boots are clean. They then have a lecture for 40 minutes, which is as much as a boy can stand. Then follows mental training, such as testing of memory, sight, hearing, and touch, followed by one hour's hand work. It must be hard work and it must be useful work. You show the boy places on the map of the works, having first shown him the general layout. You then give him some general directions and test and cultivate his sense of direction by asking him to deliver messages to different places. It is a game and can be played in teams. It is found that by this means the boys pick up a good deal in a short time.

After the first month a boy goes on a craft course, mining, structural engineering, fitting, moulding, painting; he has five choices. This is his first entry into industry. He then goes into the shops for five months, comes back again for another month for a refresher, and so continues until he is 21 years of age.

Competitive Examinations

Our method of examining these young people is as follows. We have no written examinations, but at the end of the month they sit in teams of four at a table with a chairman and two assessors—one a trade union man and the other a manager—and questions are asked about what they have seen and done. We have prepared about 200 questions and as the answers are given the assessors mark down the points scored by the teams. It is a real education, both for the trade union men and the managers.

We also have a girls' college. As we are 10 miles from Sheffield, the tendency was for all the girls to want to go to Sheffield for employment and training. We therefore set up a training school in commercial and other subjects. We give them half-time training for three years. There is a pre-entry course for the girls just as there is for the boys. They make visits and they see films, all very exciting and interesting to them. Indeed, one is frightened to contemplate the reaction when they come into contact with other people who have perhaps lost some of their early enthusiasm for the job. We do not forget the cultural side of things. Several historical plays, for example, have been produced by the young people.

Our scheme, of course, has evoked wide interest and brought many people to see it in operation. A visit from nine educationalists who spent two days with us (and, incidentally, paid their own expenses) greatly encouraged me to go on. What I would like to emphasize particularly is that whether you have two boys or three, 20 or 30, it will pay you handsomely to think how you are to get them pulling along with you enthusiastically. It is you who must enthuse them. They will not enthuse themselves. Our scheme has now been in operation for five years. We provide quarterly reports and these are posted to the parents—we take no risks—and we also give the boys certificates for further education. A boy or girl can go to an evening school and if he attends and merely keeps breathing he gets 50%—merely for exposing himself to the influence of the lecturer. We give a £5 bonus for a good report and good marks. We have found it wise to give that bonus in July because most parents give it to the young folks at that time for their holidays, whereas when we gave the bonus at Christmas the father or mother often held on to it. By doing this we have trebled the number attending the evening school. Occasionally we get some man in an important position to come along and tell the young people something of his own early struggles.

Recreations

It is essential to find ways of getting close to these young people by means of other societies and organizations. We have football, cricket, hockey, tennis, bee-keeping, model-making, debating, musical and dramatic societies, physical training, photography, golf, fishing and technical societies. All you have to do is to find someone whose hobby is one of those things. Give him £10 to start with and the thing is well under way. When toys were so hard to get we ran a Christmas toy-making class; we had an exhibition and toys were made for 150 people. We have a Sick Children's Fund and raise money for it by means of whist drives, dances, and similar functions. We have a Committee which when it hears that the child of one of the workers is sick sends round sweets, a toy, or a book. The sick child gets something when he falls sick and he gets something again when he is better. The fund is one of the best ways I know for getting close to the parents.

A most important way of getting near your workers is by a re-instatement course. It is, of course, a re-instatement course for ex-Servicemen, and it is really worth while, especially in a big works, to appoint one man to look after them. We give these men a week's course during which they go round all the works and speak to the managers. They can ask any question they like, provided, of course, it is not a personal question. After being away for a year or two the chief desire of most of these men is to get back again to their jobs. We tell them to walk round for a week and see what the firm is doing and then, when the week is over, to settle down to their work. They get their week's pay, of course, while they are walking round. We find that these re-instatement courses exercise the finest influence on these men.

The Case for Private Enterprise

Men often come back influenced by Socialist or Communist ideas. Our job is to show them that private enterprise does the fair thing by them. We have a metal rod which passes through 240 pennies, with bands round the column of coins at various points. We can let the worker know that the total column represents 20s. worth of sales by the firm and that out of this amount the coins below the first band represent wages, the amount between the first and second band represents payments for materials and so on till we come to three pennies at the top, which represent what the shareholders get. Who would suffer first and suffer most if no work was being done? With such an argument and illustration you can get men to see that it pays them to work hard for private enterprise. Of course, you must be prepared to prove that your statements are accurate. These

ex-Servicemen are very much concerned to know why they should work harder or do more than the minimum.

All our managers are keen to assist in welfare work, and last year we put £60,000 to reserve. We made £120,000 by the sale of investments and put half that sum away to provide for the rainy day, a day when we might have to drop some of our welfare activities. This windfall was due solely to careful investment made 20 years ago.

I am no visionary as far as these matters are concerned. I have had many years of active management, during which I have been in close touch with all kinds of business men, but I believe, with that experience, that this work is well worth while. I am trying to put this over so that I may win your co-operation and interest in the hope that other firms may be encouraged to take an interest in their young people. You can ask what these firms are doing in this matter and so encourage them to go ahead with the welfare side of the industry. As a Company we are very concerned with the proper development of the gas industry, having long standing contacts with Murdoch, Woodall, Sir Arthur Duckham, and others, and if anyone cares to come and see the scheme in operation, he will be made very welcome. Human sacrifice is still demanded by the gods, but to sacrifice oneself by throwing oneself into the job is really worth while. If we have any hopes of peace on earth we can only realize them by striving to make the men around us men of goodwill.

GAS COKE AND THE ENTENTE CORDIALE

FRENCH ENGINEER'S SURVEY OF APPLIANCE MANUFACTURE AND TESTING

THE testing, design, and standardization of solid fuel burning appliances in France, particularly those utilizing gas coke, were reviewed at a special meeting of the National Technical Committee and the Appliances Sub-Committee of the National Federation of Gas Coke Associations, at Gas Industry House on Sept. 7. The speaker was M. Georges Ulmer, engineer, specializing in the field of domestic heating for the Centre Technique des Industries de la Fonderie, one of the French organizations with which the Gas Coke Associations have lately been in close touch. The meeting was also attended by members of the District Coke Technical Committees, and representatives of the Ministry of Fuel and Power, the D.S.I.R., Fuel Research Board, the British Coal Utilization Research Association, the British Ironfounders' Association, and the Combustion Appliance Makers' Association.

Introducing M. Ulmer, the Chairman, Mr. W. K. **Hutchison** (Gas Light and Coke Company) said that very cordial relations had been established between the English Association and its French technical and manufacturing counterparts. The Centre Technique des Industries de la Fonderie was the central technical organization of the French foundry industry and the speaker was in charge of all laboratory and technical work in connexion with domestic heating.

Specialized Services

M. Ulmer said that the foundry industry was the least concentrated of all in France, a state of affairs which has been particularly suitable to the development of a central organization capable of promoting technical progress. General technical problems in the heating field posed by the Union of Manufacturers of Heating Appliances were passed to the Centre Technique for study in the same way as more general questions relating to the foundry industry. The Centre Technique provided a wide variety of specialized services and all general technical problems were first studied by committees of the most eminent technicians in the industry.

Following experiments and preliminary trials in the laboratories of the Centre Technique, a tentative standard for domestic heating appliances had been produced and laid before the Association Francaise de Normalisation, the French equivalent of the British Standards Institution. This standard allowed great flexibility of operation, since each appliance had to be capable of a range of operation from a slow-burning period of 12 hours at one-quarter of normal, up to a maximum of one-and-a-half times the normal rate of working. The normal operating efficiency laid down was 70%.

All appliances guaranteed to conform to the standard had a metal badge attached which was issued by a certifying committee, charged by A. F. Nor, with the granting or withholding of certificates after the appropriate tests. The committee also made certain that later production models of each appliance were up to the standard of the approved prototype. Over the two years in which this arrangement had been in operation, 25 new stoves had been approved. There was an increasing demand for certified appliances from the French public, and the manufacturers had, of necessity, had to improve the quality of their products.

For reasons of fuel economy, the French Government had decreed that the clause concerning efficiency in the standard should be obligatory—that is, appliances with an efficiency under normal operating conditions of less than 70% would be forbidden the market.

Poor Coal Resources

M. Ulmer then turned to the general question of the efficient use of fuels. Tests made at the laboratories of the Centre Technique had led to interesting conclusions concerning the improvement of appliances from the point of view of efficiency and flexibility in operation, and in the efficient use of fuels. The second of these points was extremely important for a country like France, relatively poor in coal resources, so that she might make the best use of those resources. The official trials were made with coal from Anzin, in the North of France, which contained only 8% of volatile matter. Unfortunately France possessed only a little of this class of fuel and it had been necessary to envisage the use of bituminous coals from the mines of East France, containing in some cases more than 30% of volatile matter. Such fuel must be used in two ways: either in appliances specially designed for the purpose, or as coke.

"We have been led by the demand of the French mining industry, which also produces coke, to carry out systematic tests on the utilization of cokes in stoves," said the speaker. "We have tested the various types of coke, including metallurgical coke, gas coke, and semi-coke obtained by carbonization at low temperatures (around 700° C.). These tests have shown that in general all cokes can be used very successfully for domestic heating in stoves having refractory lined combustion chambers. The efficiency has been found to be better than when using coal owing to the fact that there is less loss from unburnt gases."

Coke, went on M. Ulmer, did not agglomerate, which was obviously very important for appliances fed by gravity into the grate. In addition there was less to fear in the way of deposits in the chimney. Although there were certain types of gas cokes used in France which were more reactive and lit easily, coke generally was more difficult to light than coal, being less reactive. In continuous burning appliances this objection was of little importance since slow burning conditions could be easily maintained if the appliance was well regulated.

One of the chief difficulties met with was a psychological one. In France, as in England, the public had become accustomed to certain conceptions of what constitutes a satisfactory heating appliance, the most important of which was the idea of a visible fire. In stoves with a high efficiency and great flexibility, these conceptions had to be abandoned. The manufacturers had found that by careful propaganda and by precise and clear operating instructions, the public were gradually adopting the new ideas.

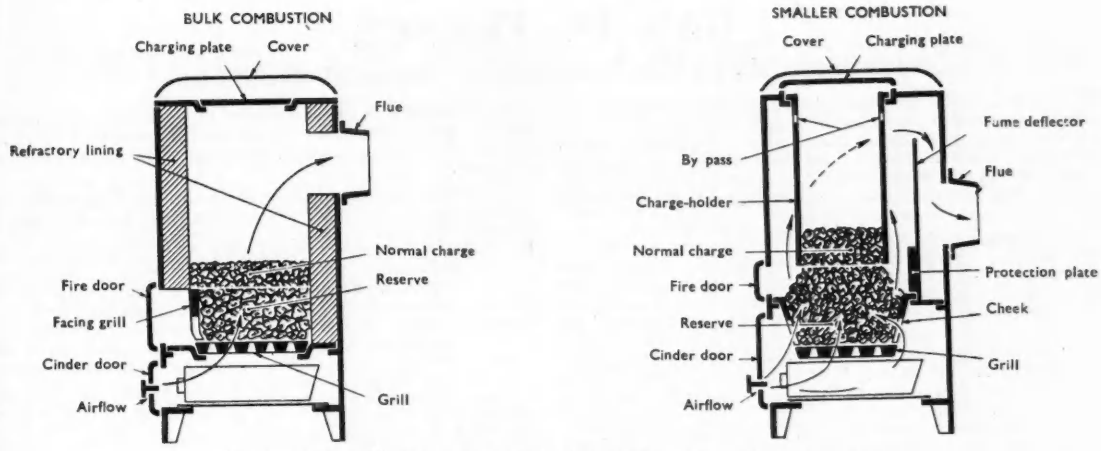
The drawing shows the two methods of construction normally used in modern stoves: it has been found that there is little to choose between them. If anything, however, the second method is to be preferred since the burning fuel bed is of constant depth and the combustion is not affected by re-fuelling. The bed thickness gives the best result when the stove is operating on a fuel approximating to English boiler coke (1¼ in. to ½ in.). The most satisfactory design of the hopper section is one surrounded completely by hot gases which served to pre-heat the fuel.

To remove the maximum amount of heat from the flue gases, the length of contact of the gases with the heating surface had to be as great as possible. It had been found that the relationship between the grate area, the heating surface, and the length of the gas path was fairly critical. It had been found in the design of the grate that all dead plate surface must be eliminated since it always led to zones of very poor combustion conditions owing to lack of primary air. One of the chief causes of poor combustion conditions had been found to be the cooling of the combustion space above the fuel bed, due to the provision in the older types of appliances of mica windows to allow the fire to be seen. Improved methods of designing the front of the stoves had led to far better gas tightness.

The design of the grate also had an important effect on the combustion conditions since it had to provide both efficient de-clinkering and even distribution of the combustion air. It had been found by experiment that the grate should have about 50% void and that a spacing of 8 mm. with a bar thickness of 10 mm. was quite good. In general in France, the idea of being able to design stoves to burn widely varying types of fuel had been abandoned as it was felt strongly that it was impossible for such stoves to have a high efficiency under all conditions.

Testing Procedure

Turning to testing procedure at the laboratories of the Centre Technique, M. Ulmer said that the chief feature of a typical test layout



Sections showing the two main methods of construction of French heating-stoves.

was a large automatic scale capable of weighing up to 300 kg. with an accuracy of 20 gr. The appliance to be tested was mounted on the platform of the scales and was connected to the chimney by means of a hydraulic joint. During the course of the test the rate of combustion could be read directly from the scale.

Before entering the chimney, the products of combustion passed through an insulated tube where temperature and draught were measured and gas samples withdrawn for analysis. The temperature was measured by a pyrometer attached to an automatic recorder. The draught was also measured by an automatic recorder and was maintained at the required value by a pressure control operating a servo-motor mechanism which determined the position of the flue damper. The analysis of flue gases was obtained by two methods: manually and by an automatic recorder.

Standard D35-301 refers to the method used in France for calculating efficiency. Appliances submitted for the approval badge had to conform to the conditions set-out in the standard for slow burning and overload conditions.

Concluding, M. Ulmer said that technical progress in domestic heating in France was a concrete example of the results to be obtained from close and friendly relationships between industry and central research and technical organizations. They felt that friendly liaison between English and French technicians could not fail to produce very fruitful results.

Aiming at Higher Efficiency

Dr. **F. J. Eaton** (Chairman of the Appliances Sub-Committee of the National Technical Committee), opening the discussion, said that the audience had been very interested to hear from M. Ulmer that in France they were aiming at higher efficiency in domestic appliances, as we were trying to do in this country. He described the set-up for testing appliances in this country and referred to the catalogue of approved coke-burning appliances published here before the war —the first of its kind in the world. Agreement had been reached in this country on methods of testing appliances, but these methods were very different from those in France. In this country we tended to go in for multi-duty appliances, providing hot water as well as space heating, a thing that was very rare on the Continent. Here, too, we paid great attention to radiation and therefore had to introduce methods of measuring radiation from appliances which gave varying types of radiation. The test methods we had to adopt were therefore more complicated than in France. M. Ulmer had said that the efficiency of stoves should be not less than 70% under normal operating conditions. But what were normal operating conditions?

M. **Ulmer**: Normal operating conditions are characterized by 4,000 calories per sq. ft.

Dr. **Eaton** said that in this country we had not yet got to that stage, especially in regard to heating stoves. He had also been interested to hear that the fuel used for testing had 8% volatile matter, corresponding to our Welsh dry steam coal. Here, we generally tested with coke or bituminous coal. On the Continent a method of testing on scales had been adopted. He had tried the method for domestic hot water boilers but because of the differences of temperatures and the difficulties of arranging that the water temperature should be the same, we had found that the accuracy with this method was not as great as we should like. We had had to adopt a somewhat laborious testing procedure of about 12 hours.

Mr. **J. S. Hales** (British Coal Utilization Research Association) hoped that the discussions they had had with M. Ulmer would benefit both France and England. The methods of testing adopted were very different and he thought that the reason lay in the fact that our appliances were also different. That was emphasized by the figure of 70% for efficiency given in the paper: a very high figure even with fuels of as low a volatile content as 8%. The authorities were to be congratulated on adopting it. An interesting point mentioned had been the tendency to ask for a visible fire and the tendency to substitute a mica window.

Mr. **R. H. Rowse** (Fuel Research Institute) said that a great deal was due in this country by close co-operation between the makers and the fuel industries and Government Departments. In this country we had had in a short time to create a demand for new appliances and see that they were acceptable to both local authorities, who were responsible for most building, and to the housewife.

Mr. **J. Price-Walters** (Ministry of Fuel and Power) said that he too hoped for continued co-operation with the French engineers. The position with regard to fuel supplies was exactly the same here as in France. We were not poor in fuel resources but we were certainly poor in the amount and quality of fuels that we could allocate to our own domestic market. Economy necessitated that our best fuels be exported.

Mr. **E. J. Blumsom** (B.I.A.) said that manufacturers appreciated very much the collaboration which existed in this country between the research associations and the Ministry.

Mr. **H. V. Shelton** (B.I.A.) said that British manufacturers appeared to have a common problem with the French. The French were to be congratulated on the initiative they had taken and he would welcome an extension of the collaboration between the two countries

A vote of thanks to M. Ulmer was moved by Mr. **W. Thomas** and seconded by Mr. **G. H. Fuidge.**

BROTHERTONS AFTER 70 YEARS

Celebrating its 70th anniversary this month is the well-known chemical manufacturing company of Brotherton and Company, Ltd. of Leeds, founded on Sept. 1, 1878, by Edward Allen Brotherton, who later became the first Baron Brotherton of Wakefield.

With negligible resources, E. A. Brotherton, then 22 years old, established the Company's first works at Wakefield to manufacture sulphate of ammonia. Many gas manufacturers at that time were pouring their ammonia liquor to waste and Brotherton saw the great potentialities which lay in the recovery of this ammonia and its conversion into the ammonium sulphate needed by agriculture. His idea soon attracted capital and the firm was formed under the name of Dyson Sons and Brotherton. Four years later a small works was opened in Leeds; the manufacture of pure liquid ammonia and the production of carbonate and bicarbonate of ammonia was added to the Company's activities.

In 1893 Edward Brotherton secured the contract for the gas liquor produced by Birmingham Corporation and opened a works in that city. The distillation of crude coal tar and the addition of a wide number of coal tar products were later added to the Company's products.

Present activities of the firm include the production at Wakefield of hexamine, widely used in the manufacture of plastics and as a fuel, used notably in the Olympic torch.

Ammonium carbonate and bicarbonate are also produced at the Wakefield works, while the Birmingham works turns out ammonium sulphate.

An International Festival of Scientific Films will be held in London on Oct. 8, 9, and 10. There will be two sessions daily from 2.30 p.m. to 5.30 p.m., and from 7.30 p.m. to 10.30 p.m. It is anticipated that public attendance at these shows will eclipse even that of the Festival held last year in Paris. Early application for tickets should be made to the Scientific Film Association, 34, Soho Square, London, W.1.

GAS IN FRANCE

Pitch-Base Paints : Gas Transmission : Industrial Architecture

THE August *Journal des Usines à Gaz* presents three technical articles: G. Combet, Inspector-General of Electricité de France, on the estimation of the probable capacity of systems of transmission of gas; A. Marty, Chief of the Tar Section of the Research Department of Gaz de France, on the past and future of paints with a pitch base; and historical notes on industrial architecture by M. Veillon.

M. Combet opens with the remark: "The engineer who has to determine data for a project for the transmission of gas often tends to estimate the probable capacity by calculating on optimistic lines the eventual development of consumption. On the basis of a capacity which risks remaining for a long time in excess of requirements, the determination of the most economical diameter of the main leads to a theoretical figure lying between two commercial dimensions of which he generally chooses the larger. This procedure is inspired by a laudable prudence. But prudence is not always and everywhere the best counsellor." M. Combet examines in an elegant mathematical treatment the two cases of low and high pressure transmission. In the first, he shows that assuming the cost of the system varies directly as the diameter of the main, capital charges are five times the cost of compression, and that if the estimation of demand is low such an error has only a very slight influence on the cost of transmission per unit volume, and that this cost remains below the estimate if the error in this direction does not exceed 80%, but that over-estimation of the demand must be avoided. On the basis that the cost of installation varies not as the diameter but as the sectional area of the main the same conclusions are reached, though not so marked. It is shown that it is better to err by under than by over estimation, provided that the error does not exceed 50%.

These conclusions are even more evident in the case of high-pressure transmission. Here the cost of transmission is lower when the real demand lies between 1.0 and 1.6 of that provided for; it only rises by 5% when the ratio is 2. It is important, therefore, in these estimations to keep on the low side in fixing the probable demand. In other words, it is no ultimate economy to instal a main in excess of probable requirements.

M. Marty traces in a lively and most interesting essay the use of bituminous paints, or that of natural asphalts and bitumens, back to the Tower of Babel, the walls of Babylon and Nineveh, and even to Noah's Ark. Etymology shows that the French word *goudron* is derived from the Hittite *karabé*, a natural asphalt used by the Sumerians, &c., and indeed the word *bitumen* signifies *protective action*. (Our own word *tar* derives from the same source as the Danish *tjaere*; it originally referred to bituminous resins of vegetable origin.) These ancient tars and bitumens were used for caulking and painting ships and boats long before those derived from the distillation of mineral coals were known.

Paints with a coal-tar pitch base began in 1863 with the recipes of Becker, though a French patent of 1861 had described a black varnish for the protection of iron with the formula, coal-tar pitch 66.5% and "coal-oil" 33.5%. In 1885 Lunge in his treatise on tar distillation gave two methods of preparing "pitch varnish" which are still the basis of modern manufacture; he also indicated several suitable dries for use with them. After this date, however, linseed oil paints were introduced which, with their brilliant colours and excellent drying properties, caused the abandonment of pitch varnishes until about 1926, when the development of aeronautics presented the problem of effective protection of the large metal-covered hangars at a low cost. The acute shortage of linseed oil after 1940 accelerated the developments of paints with a pitch basis, and very soon a product which at first was merely a substitute began to reveal properties and advantages of its own. "Tens of thousands of tons of iron and thousands of machines" are now protected by pitch-base paints.

M. Marty distinguishes two types of protective covering: one in which a film is applied which subsequently oxydizes, resinifies, hardens and becomes gradually impermeable—in short, in which the ultimate protective film is chemically different from that which was applied; the second, in which the protective film is carried in a solvent which evaporates leaving a covering more or less hard, resistant, and more or less plastic—the film itself has undergone no chemical change, the solvent is merely a vehicle to facilitate spreading in a thin coating. Pitch paints are in the second category. In their practical application, the point is stressed that the metallic surface to be covered must be suitably prepared. These paints are not normally used over a primer; they are not intended to be covered with a protective varnish; in general they are self-sufficient. They lend themselves to "metallization" with aluminium powder which results in a bronzed appearance. Pitch paints, black or coloured, may however be used over old oil paints or on a primer of red lead. But the use of other paints over pitch paints, particularly when it is black, presents some difficulties which can be overcome by "isolating" the pitch paint film, covering it with certain gums in an alcoholic solvent which has no action on the pitch. Metallization has a similar effect.

M. Marty points to the value of these developments in times of national economic difficulty as yet another example of the use of the derivatives of indigenous coal, saving the importation of external raw materials.

"Historical Notes on Industrial Architecture," by M. Veillon, is a continuation of the introduction under the title "Æsthetics in Industrial Structures" which were noted in the "GAS JOURNAL" last month. The period covered is that of the 19th and 20th centuries. In the initial stages of industrial equipment it was a question of purely utilitarian design. Shed-like buildings in brick, stone or timber served all purposes, whether gas-works, machine-shops or the surface-works of mines. Later the development of industrial installations and the appearance of new materials for construction led to different types of structure to suit different purposes. The dates of the several stages are not clearly marked and it is difficult to establish a definite classification. In the early stages of metallic structures cast iron predominated. Gasholder columns, for instance, were cast with bases and capitals imitating the stone pillars of ancient architecture. Wrought iron structural elements were decorated with gussets cut into curves, with superimposed stamped ornaments' and latticed girders were purposely made with a very small mesh with supposed aesthetic effect.

M. Veillon marks 1900 as the "apogee of complication and the use of floral ornaments"—*e.g.*, the use of ornamental wrought iron for gates and fences. This was followed by a period of simplification to reduce cost and we have the stark structural steelwork with all its rivets and gussets unadorned, improved in 1930-35 by the appearance of the broad-flanged beam and later by the use of welding. From 1892-1900 the use of reinforced concrete expanded more and more rapidly—standardized by official rules in 1906. The style in 1900 showed an urge to curved forms. Later came the use of frames with brick filling inspired by steel constructions and finally the monolithic constructions with geometric shapes. Developments in brickwork, the use of aluminium and various types of painting are also briefly referred to.

The *Journal* proposes to continue the series with the publication of further chapters, of which no less than 19 are listed among the headings of which are included: "Metallic Structures in Gas-works," "Retort Houses," and "Gasholder Foundations."

Among news items are a report of a paper by M. Coulaty on the search for petroleum in the south-west of France, and one by M. Fisch on district heating. M. Fisch comes to the usual conclusion, that such schemes are only economical in particularly favourable cases and that their establishment and development is likely to be costly in labour and material. He suggests, however, that these works might be included in times of over-production and unemployment among public works to be undertaken to provide employment.

ODORIZATION OF GAS

To the latest *Monthly Bulletin* of the Société Suisse de l'Industrie du Gaz et des Eaux, Dr. G. Bodmer, of Schlieren, contributes a comprehensive article dealing with the odorization of gas, in the course of which he describes a number of experiments. The problem of gas odorization—the author states, summing up—is old, and up to date no solution has been found that is technically and economically satisfactory. Among the numerous products with which experiments have been made two groups satisfied the requirements most nearly: First, oils containing sulphur which were formed through pyrogenic decomposition, like raw benzole, lignite tar oil, condensates from oil gas production, and by-products from the cracking of mineral oils generally. ("Calodorant No. 3" which has been used in America for about 20 years is such a product.) These have a smell similar to that of gas and are, therefore, suitable for intensifying gas with a weak smell, such as was of necessity produced during the war.

The second group of suitable products consists of mercaptans. In old houses with kitchens that are difficult to ventilate, the warning effect of ethyl-marcaptan is diminished. Amyl mercaptan has been used more and more in America over the last 10 years. It is cheap and fulfils most technical and economic requirements, but its use presupposes a re-education of the consumers, because the smell is a new one. It has the advantage of increasing the smell regardless of the remaining benzole content, and of facilitate control of leakage.

The gas undertaking of the Zurich municipality, with the co-operation of the health authorities, studied the problem of gas odorization under war conditions. Some of the experiments, made at Zurich University in April and December, 1946, were described in the course of the article. It was found that an intensification of the normal smell of gas was preferable to a smell, however strong, unlike that of gas.

ASSOCIATION OF PUBLIC LIGHTING ENGINEERS

ANNUAL CONFERENCE AT EASTBOURNE

THE annual conference of the Association of Public Lighting Engineers was held at the Winter Garden, Devonshire Park, Eastbourne from Sept. 13 to 17. Mr. Thomas Wilkie (Leicester), the retiring President, presided at the business meeting on the Monday afternoon, and after a civic welcome had been extended to the members and delegates by the Mayor of Eastbourne (Councillor Randolph E. Richards, J.P.) he inducted his successor, Mr. Norman Boydell, M.I.E.E., A.M.I.Mech.E., Manager, East Sussex and South West Kent, South Eastern Electricity Board (formerly Borough Electrical Engineer, Eastbourne).

The following loyal message was sent to Buckingham Palace: "We, the members and delegates of the Association of Public Lighting Engineers now meeting in conference in Eastbourne, respectfully tender to Your Majesty our sincere and loyal greetings." At the Mayoral reception in the evening the President read a reply received from His Majesty's Private Secretary.

Bereavements

The **President** referred with sorrow to the losses which the Association had sustained by death since last year's meeting at Southport. In the first place he referred to Mr. H. O. Davies, the Secretary of the Association, who had died very suddenly after a short but very severe illness. Members of the Council probably more than the ordinary members of the Association felt the loss of his services. It would be difficult for anyone to fill his position with that tact and ability and courtesy which he had always shown. He next referred to Mr. J. S. Dow, who was for a long time Secretary of the Illuminating Engineering Society and latterly its President. He was also for four years Secretary of the Association of Public Lighting Engineers. He was well known throughout the country and the world, and he always showed a great interest in lighting matters and in the affairs of the Association. The Illuminating Engineering Society and the Association of Public Lighting Engineers had never in any sense been competitors. They had the same ends but they approached them from different angles. Another loss was sustained by the death of Mr. A. Forbes, of Aberdeen, one of the original members of the Association, and President in 1934. Those of the members who attended the Aberdeen meeting must have been struck by the sincerity with which Mr. Forbes carried out his duties. He was one of the old school, the type of man who was rapidly dying out, a man who at all times took an interest in the work of the Association.

The Association had also sustained a grievous loss by the death of Sir Clifford Patterson, who was made an Honorary Member of the Association as far back as 1928. Although he was not an active member of the Association, the staff over which he had control had been staunch supporters of the Association. Suitable condolence had already been sent to the relatives of all four gentlemen, but he invited the members to rise in silent sympathy.

Mr. **H. C. Brown,** Hon. Treasurer, presented the accounts for the year ended Dec. 31, 1947, which were adopted without question.

The **President** paid tribute to the great amount of work which Mr. Brown had done for many years as Treasurer of the Association The fact that he had now retired from his normal work did not mean much, because he was probably busier than he had been before. He always showed a great interest in the Association, and was deserving of their best thanks.

Messrs. Gundry, Cole & Co. were re-elected Auditors for the ensuing year.

New and Old Council Members

The **President** announced that as the result of the ballot Mr. R. Parker, Mr. H. Pryce Jones, and Mr. C. C. Smith had been elected members of the Council. They were, however, losing two members of the Council in the persons of Mr. W. N. C. Clinch and Mr. H. V. Emptage. Mr. Clinch had been a member of the Council for many years and it was only because of the operation of their articles of association, under which he became ineligible, that he was retiring, but he hoped that in due time that defect would be remedied. Mr. Emptage was eligible, but owing to his impending retirement from his official position he did not wish to stand again. On behalf of the members he wished him many happy years of retirement.

The **President** referred to the fact that on the death of Mr. Davies the Association had to go into the question of finding a successor as Secretary. Having given great thought to the matter, they had unanimously appointed Mr. Eric Evans, who had served with Mr. Davies for many years. The Council were convinced that he would be a worthy successor to Mr. Davies, and he was sure that Mr. Evans would not look in vain for all the help that the members could give to him in his office.

Mr. **E. J. Stewart** (Glasgow) moved a cordial vote of thanks to Mr. Wilkie for his services as President and for handling the meeting so harmoniously. Mr. Wilkie was a man of ripe experience in handling councillors, and he had therefore had no difficulty in handling his brother lighting engineers.

Mr. **A. S. Tapsfield** seconded and said it had been a real joy to sit under the Presidency of Mr. Wilkie.

Mr. **Wilkie** said they were greatly honoured by the presence of Councillor R. E. Richards, the Mayor of Eastbourne, who had come to give them his blessing and the blessing of the County Borough of Eastbourne. He often felt it must be a bit of a bore to be a Mayor and be expected to turn out at all sorts of functions during his year of office, but in the present instance he felt there was a common interest in their aims and objects which were so closely allied to the local government service and which were founded on the basis of saving human lives.

The **Mayor of Eastbourne** said this was the second or third engineering conference that he had had the pleasure and privilege of welcoming to Eastbourne during the current season, and it was a special pleasure on this occasion because the incoming President was Mr. Boydell, who was in charge of their local supply of electricity. He had no doubt that load shedding would be kept to a minimum and arranged so as to cause the least inconvenience. Mr. Boydell was an authority on lighting, and from a paper which he read last year at the Public Works, Roads, and Transport Congress he had learned that in this country alone during one year nearly 19,000 gas street lamps were replaced by electric lamps—it was as well that he was not a Director of the Gas Company—and that 22,000 more electric lamps were installed in newly laid thoroughfares. These were impressive figures and seemed to him to give them justification for spending one week in 12 months in discussing in the cold light of day the problem of better illumination.

He understood that in the past much progress had been achieved as the result of competition between gas and electricity; that one had vied with the other to produce the most efficient and the most effective form of street illumination. In the future that element of competition would not be so pronounced, for both sources of supply would be responsible through a National Board to the Ministry of Fuel and Power. He thanked the Association for coming to Eastbourne and said they would do their best to make their stay enjoyable.

Mr. **Wilkie** thanked the Mayor for his warm welcome, and the Mayor briefly replied.

Induction of President

Mr. **Wilkie** then formally introduced Mr. Boydell as the new President. At such ceremonies, he said, it was usual to say many nice things about the incoming President; sometimes not all that was said was true, but on this occasion he could maintain his integrity because all the nice things he could say would be perfectly true. Mr. Boydell had served on the Council for many years and had always been ready to help and give his advice. He was coming to the Presidency at a time which he felt was going to be different from any other. Many changes had been made and were impending, and they would probably see more control from central authorities. That might or might not be a good thing, but he was certain that with his wisdom Mr. Boydell was going to do well. In investing him with the Presidential collar he wished him every happiness and expressed his confidence that he would live up to the high traditions of the Association.

Mr. **Boydell,** the newly installed President, expressed his sincere and deep appreciation for the honour he had received and promised to do his best to follow the examples of his many illustrious predecessors. As he was to deliver his Presidential address next morning he did not propose to say more at that stage, but he had the honour and privilege of presenting to Mr. Wilkie his Presidential certificate and badge—a badge of unusual interest in that it bore the dates of Mr. Wilkie's two periods of office as President: 1930 and 1947.

Mr. **Wilkie** briefly acknowledged the honours and said he would wear the badge with a great sense of pride.

Mr. **Boydell** said his next pleasant function was to introduce the new Vice-President, Mr. A. S. Tapsfield, of London, a lighting engineer of great distinction and one for whom the Council had the greatest esteem. Personally he was assured of the utmost support from Mr. Tapsfield during the coming year of his Presidency.

Mr. **Tapsfield** briefly returned thanks and said he hoped he would be able to emulate the splendid examples of the many excellent men who had preceded him as Vice-President.

Mr. **Boydell** announced that this concluded the business of the annual general meeting, and he invited as many members as possible to inspect the exhibition of public lighting equipment (described in the "JOURNAL" last week).

The **Mayor** then formally opened the exhibition.

GAS AT WALLASEY'S CIVIC WEEK

An average of 5,000 visitors a day attended the exhibition run by the Wallasey Council in connexion with Wallasey Civic Week, and special visits from the exhibition hall to the gas and water undertakings necessitated the provision of additional buses. Visitors from other areas joined the parties on these trips.

The week opened on Aug. 21 and continued until Aug. 28. Meetings, demonstrations, and lectures were held at the new Gas Service premises, Brighton Street, and in the Demonstration Offices, Mill Lane Water Tower. Daily film programmes included a number of gas industry films, including " Romance of a Lump of Coal," " Manufacture of Gas," " Getting into Hot Water," and " Gas in Battledress." Sightseers were able to compare the virtues of gas and electricity in two Council houses furnished by local firms, one fitted with electric appliances, the other with gas.

A review of the progress of the Council's gas and water undertaking is given in the brochure issued for the week, and on sale to visitors. It reports that after the completion of the scheme of renewal and extensions now in progress at an estimated expenditure of £180,000, the gas-works at Gorsey Lane will be one of the most modern undertakings in the country, comprising the latest design of installations of vertical retorts, automatic carburetted water gas plants, coke handling machinery, purification and chemical process plants. The undertaking now supplied 26,000 consumers and is now almost a hundred years old. The total output of gas during the year 1947-48 achieved an all-time record of 1,083 mill. cu.ft.

There are 166 miles of cast iron mains in the borough, from which 29,000 gas cookers, 14,500 gas fires, 12,000 gas washing-machines, hot water boilers and other home service appliances are served. Trunk mains and inter-connexions have also been established for high-pressure distribution of bulk supplies of Wallasey gas to district areas, including two neighbouring gas service undertakings. A comprehensive extension scheme is being carried out this summer to increase the service to Leasowe, Moreton, and Saughall Massie, where extensive housing developments are in progress. Cost of this new service will be £10,000.

The Appliance Sales Section maintains four showrooms situated at the Capitol Buildings, Liscard, the Town Hall, King Street, and at Hoylake Road, Moreton. The King Street offices and the accommodation in the Town Hall are to be replaced by a new modern Gas Service Building, comprising showrooms, lecture and demonstration theatre, and offices, at the Brighton Street-Clarendon Road corner.

Gas lighting of highways and roads includes 4,000 units. During the 12 months ended March, 1948, 44,000 tons of coal was carbonized for the production of 1,083 mill. cu.ft. of gas fuel, 21,000 tons of smokeless solid coke fuel, 3,500 tons of crude tar containing numerous chemical bases and compounds, 56,000 gall. of crude benzole, 250 tons of crude sulphur, and 600 tons of ammonia in water.

GAS PLANTS IN POLAND

Considerable expansion of the gas plants has taken place in Poland since the war. Whereas Poland had 104 plants prior to 1939, their present number is 261, and 243 of them have an annual capacity of 600 mill. cu.metres of gas. The most important plants are located at Warsaw, Wroclaw, Poznan, Gdansk and Cracow. Some of the gas plants belong to the cities in which they are located, others are State owned, but for statistics and technical supervision they all come under the Power and Traction Board.

During the war most of the plants were put out of action so that at the end of hostilities only 53 were operating. The following table shows the increase of production in cu.metres during the period 1945-47:

Production of municipal plants—1945, 84,708,000 ; 1946, 180,714,000 1947, 236,748,000.

Purchases of natural gas—1945, 13,852,000; 1946, 18,838,000; 1947, 19,313,000.

Total production of natural gas—1945, 137,000,000; 1946, 144,000,000; 1947, 160,000,000.

Production of the natural gas is controlled by the Central Petrol Board and its main sources are near the towns of Jaslo, Krosno and Cieszyn. Its pressure is high and there is no difficulty in transmitting it through the inter-urban grid, the mileage of which is 550 miles. A good deal of natural gas is also being imported from the rich sources in East Galicia, which now belong to Russia. Research work is being carried on in several districts where there is a likelihood of finding natural gas.

It is hoped that the fulfilment of the 10 Year Plan will result in the production of 959 mill. cu.metres of coking gas in 1950 and 1,889 mill. cu.metres in 1958, when the Plan ends.

The gas grid of Upper and Lower Silesia consists of some 500 miles of high pressure pipes and 450 miles of pipes for low pressure inter-urban transmission of coal gas. For the time being three stations for compressing gas are in operation. In view of the increased use of compressed gas by motor cars, seven others are under construction, and it is calculated that in several years some 5,000 lorries will be able to use gas instead of petrol.

GAS DEMAND UP AT BIRMINGHAM

With an increase of 11% in output in the current year, Birmingham Gas Department reports that the quantity of gas sold has risen by 35% since 1939. The record of daily output of gas now stands at 96 mill. cu.ft., but this figure is expected to be boosted to 100 mill. per day during the winter.

The Department embarked upon a complete reconstruction of its Saltley Works in 1941, the work being finished in 1946, increasing the capacity from 6½ mill. cu.ft. to 19 mill. cu.ft. per day. The increasing demand called for still further developments and in 1945 plans were approved for additional plant at Nechells Works, comprising carbonizing and coke handling plants, purifiers, and various ancillaries. This extension is partially to displace obsolete plant and will give a net increase of 2 mill. cu.ft. per day. It is expected that the new plant will be in use in the spring of 1949. Reviewing the development of the gas undertaking, the Birmingham Corporation's *Your Business* states that by 1946 it was clear that the Nechells extension would not meet the requirements of a few years ahead, and accordingly a new gas-works at Swan Village was planned with a capacity of 8½ mill. cu.ft. per day. The project, after many unavoidable delays, has only just received official sanction and work has just commenced. It will be five years before gas making can start on the new site.

At the present rate of expansion, even the Swan Village output will soon be absorbed and further schemes are being prepared. A new gas-works is expected to be built on land at Washwood Heath long scheduled for the purpose. A very large works is to be built there but it is unlikely that even a portion of this could be in production for six or seven years. Because the position of the Department with regard to production plant will be critical until the new works at Swan Village is completed, it has been decided to install producer gas plant to safeguard the position in the intervening period. Luckily, it has been found possible to buy four plants which were installed in Government-controlled factories during the war and since declared redundant. These plants have been in use for only 18 months or two years and can be dismantled, transported, and re-erected within a matter of eight or nine months.

The proposal is to make coal gas of a higher quality than at present in the retort houses and to dilute it with producer gas down to the present calorific value of 450 B.Th.U. per cu.ft. By this means the daily make will be increased by about 10 mill. cu.ft. and it is hoped that this will meet the demand until the Swan Village works is ready to start work. This proposal is also expected to result in a considerable oil saving, as it will not be necessary to make so much water gas as a base load as has been the case recently.

SPALDING GAS EXTENSIONS

To supply the Long Sutton and Sutton Bridge Company with additional gas, Spalding Gas Department has extended its high pressure main from Holbeach to the Long Sutton boundary, where the gas is metered, and a further main connects up with Long Sutton gas-works and its sub-station at Sutton Bridge. The Long Sutton Company originally applied to the Ministry of Fuel and Power for permission to erect additional gas producing plant, but their requests were turned down and they were advised to obtain supplies from Spalding.

Approximately 8,000 yards of 6 in. main have been laid by the Spalding Gas Department, using their own labour. The cost of this work, including the meter, governor gear and meter house, was £10,300. The Long Sutton Company has also laid approximately 2,100 yards of 6 in. main, the work taking 4½ months to complete. The main is connected to the compressing plant at the Spalding works, which will compress 40,000 cu.ft. of gas per hour at a pressure of 30 lb. per sq. in. The maximum requirement at present is 10,000 cu.ft. per hour, which will be ample supply for the present output of 30 mill. cu.ft. per year.

Spalding Gas Department also supplies a similar quantity of gas to its Holbeach sub-station, and parts of Weston, Moulton, Whaplode and Gedney are supplied with high pressure gas. A scheme for the provision of high pressure supplies as far as Moulton station has recently been approved by the Ministry of Fuel and Power, and it is anticipated that gas will be available at Fleet in the near future. This will mean that all areas between Spalding and Sutton Bridge, a distance of approximately 16 miles, will be using gas produced at Spalding. Spalding Department is also installing compressing plant, with a capacity of 80,000 cu.ft. per hour, which will be used to improve supplies in the northern area, including Pinchbeck, and for the development of supplies in the rural area to the north and west of the town.

During the coming winter the Long Sutton Company will continue to produce gas, which will be augmented from Spalding, but when the additional carbonizing plant, at present under construction at Spalding, is completed it is expected that the Long Sutton works will cease production. While the work of laying the high pressure main was in progress an 8 in. low pressure main was laid in Holbeach from Market Hill to Mattimore House. This main will eventually be connected to the Holbeach sub-station of the Spalding Gas Department and will be instrumental in improving the gas pressures in Holbeach.

The whole of the work has been carried out with the close co-operation of the Engineer (Mr. J. Sullivan) of the Long Sutton Gas Company.

GAS UNDERTAKINGS' RESULTS

South-Western Gas and Water Corporation, Ltd.

The Directors of South-Western Gas and Water Corporation announce that the Company is paying on Oct. 1, 1948, an interim dividend of 2% (actual), less income tax, in respect of the year ending Dec. 31, 1948.

Alliance and Dublin Consumers' Gas Co.

The accounts show a surplus on revenue account for the half year ended June 30 of £56,723, compared with a deficit for the corresponding period last year and a surplus of £30,661 for the December, 1947, half year. After providing for Debenture and other interest and taxation, there remains £30,416, which with interest received and balance brought forward, makes total for allocation £42,039. The Directors have recommended a dividend of 2½% actual (against 2%), leaving £12,766 to be carried forward, against £9,053 brought in.

Motherwell and Wishaw Gas Department

In his annual report, Mr. William Kirk, Engineer and Manager of Motherwell and Wishaw Gas Department, says that the gross income for the year was £188,876 and the gross expenditure £168,853, leaving a gross profit of £20,023. Sinking fund charges, interest and income tax amounted to £24,073, leaving a loss on the year's working of £4,050. After allowing for the sum of £223 brought in from last year, the net debit balance carried forward is £3,827. War damage reserve of £5,500 has been reduced by £1,000, and the revenue account credited with a similar amount.

Increase in coal prices during the year of 4s. in October and 2s. 6d. in January added £7,468 to the cost of the year's fuel. An increase in the price of gas which became operative on Aug. 16 will produce an additional £9,000 in the current year, and should enable the accounts to be balanced at the end of the financial year.

The number of consumers calling at showrooms was over 8,000, and sales amounted to £11,531. The hire-purchase scheme, resuscitated last year, was responsible for £7,712 sales under 402 agreements.

Coal deliveries had been well maintained, but the quality left much to be desired. The volume per ton was reduced and consequently the thermal yield. The yield of coke increased slightly, but the amount of breeze made increased from 1.13 cwt. to 1.81 cwt. per ton of coal carbonized, thus reducing the quantity of large coke for sale.

Darwen Gas Department

Darwen Gas Department in the year ended Mar. 31, 1948, made a gross profit of £8,571, which after deducting income tax of £3,483 and interest on loans, &c., leaves a net profit of £2,736. The Department has contributed £1,050 to the rate relief. The total quantity of gas sold for all purposes during the year was 375 mill. cu.ft., compared with 343 mill. cu.ft. in the previous year, an increase of 9.3%. The quantity supplied for domestic purposes was 272 mill. cu.ft., an increase of 6.3% and, was more than double the 1939 domestic consumption. The quantity of gas sold to industry was 94 mill. cu.ft., an increase of 24% compared with last year and almost double the quantity used in 1939. There is every reason to expect the industrial load to increase very considerably in the future, says the Gas Engineer's annual report. Owing to the additional restrictions on street lighting, the quantity of gas used for this purpose was reduced to 9 mill. cu.ft. compared with 11 mill. cu.ft. the previous year.

A record was reached during the year in respect of appliances sold, the total value amounting to £32,768. Incomes from saleable by-products, including coke, tar, and benzole, amounted to £39,191, or 70.11% of the cost of coal carbonized. The average cost of coal during the year was £2 12s. 7.26d. per ton compared with £2 8s. 3.84d. per ton last year, 108.4% above the cost in 1938-39. To meet the increased cost it was decided to increase the price of gas on Feb. 2, 1948. Approximately 2,300 tons of coal were saved during the year by the manufacture of carburetted water gas.

A very considerable amount of works maintenance was completed during the year. A scheme for the partial reconstruction of the works is now well in hand, the contracts having been placed for a new dry purification plant, two new exhauster sets, a new ammonia washer, gas condenser, and electrostatic detarrer. A tender has also been accepted for the provision of a new messroom and works storeroom.

Benzol and By-Products Co., Ltd.

The Directors have declared a dividend of 3% on the 6% participating preference capital for the half-year to Sept. 30, 1940.

TRADE NEWS

Wellington Tube Works, Ltd., Great Bridge, Tipton, Staffs, have issued a new price list of gas tubes and fittings products. It is a standard list, replacing all previous issues, and includes a table of standard dimensions and weights in accordance with British Standard specifications.

A New Glass Pump

An important development in pump design was introduced recently by Tungstone Products, Ltd., with the demonstration of a new glass pump. Made of "Pyrex" brand borosilicate glass, it makes possible for the first time conveying of all acids and alkalis of pH−8 or less (concentrated hydrofluoric and glacial phosphoric acids excepted).

It is of interest to note that the use of glass is made possible by the absence in Tungstone pumping equipment of all centrifugal and reciprocating stresses. The pump has the additional advantages of visibility, cleanliness, and a capacity for withstanding temperatures up to 200 C. It can be flushed with steam, hot water, or hot acid solutions. With a capacity (4 ft. inlet head) of 300 gal. per hour, at up to 50 lb. per sq. in. delivery pressure, and requiring 1½ to 4½ cu.ft. of free air per minute, the Tungstone pump weighs 54 lb., and measures 13 in. by 13 in. by 30 in. overall height.

Loading Simplified

A new device which combines cheap, efficient and rapid handling will be seen at the 14th International Commercial Motor Transport Exhibition, at Earls Court, in October. The Anthony hydraulic tailboard loader, manufactured by Anthony Hoists, Ltd., Braintree Road, South Ruislip, has been proved by practical experience in the United States. This equipment was designed and developed by the Anthony Co., Inc., of Streator, Illinois, and in the past four years, users in over 63 industries have found the loader invaluable by improving their efficiency in handling of goods. The loader is in its essentials a standard tailboard hinged from the bottom. When the tailboard is dropped level with the floor in the normal manner it may be lowered horizontally to ground level on supporting arms, and goods may then be loaded on to it with ease. By the movement of a lever the tailboard is powered by a hydraulic cylinder in the upward direction, thus lifting the load to truck floor level. Conversely, the truck may be unloaded in a similar manner. The tailboard loader derives its power from the vehicle engine through a power take-off mounted on the gear box, which is engaged in the normal manner by a lever in the driver's cab. The equipment is designed and guaranteed to lift a load of 15 cwt., and the hydraulic system incorporates a safety valve to prevent injury to employees and goods in the event of overloading. The loader will be available for most makes of vehicles from 1½ tons upwards, special equipment being obtainable for articulated trailers. Each loader is complete with power take-off, drive, controls and all fittings ready for mounting. It can increase efficiency and cut costs by enabling one man to do, in a much shorter time, the work for which two or three men have previously been required.

PUBLICATIONS RECEIVED

Technical information on the protection of structural steelwork from fire is included in the second number of the *F. P. A. Journal*, publication of the Fire Protection Association, whose address is now 84, Queen Street, E.C.4. The degree of protection, says the *Journal*, is related to the fire load, that is, the number of B.Th.U. per sq. ft. which would be liberated in the event of the contents and combustible parts of a building being burned out.

* * *

The 1947-48 edition of the classified handbook of members and their manufactures has been published by the British Engineers' Association, 32, Victoria Street, London, S.W.1. Its contents include a list of the Council and officers of the B.E.A., details of its objects and activities, conditions of membership, and of the specialized engineering services available to members. There is a valuable feature for overseas firms with dealings with British engineers which tells how the Association can help them. The volume's main feature is an alphabetical list of members, complete with addresses of all branches, telephone numbers, and telegraphic addresses, and details of their manufactures.

GAS STOCKS AND SHARES

The week opened on the Stock Exchange with markets becoming somewhat steadier, sentiment being assisted by activity in the political field, particularly the endorsement by the T.U.C. of the Government's policy on wages and profits, and the brighter prospects of the French Government under M. Queuille. Transport shares were by far the most active, following the preceding week's boom when compensation terms for Thomas Tilling's concerns were announced. Industrials generally, however, were irregular and British Funds eased in places.

The week closed with reduced business caused by the grave deterioration of the international situation, explained by Mr. Bevin and Mr. Eden. Aircraft shares improved after Mr. Morrison's announcement of the increased production of fighter planes but industrials on the whole were dull. Markings passed the 6,000 mark only on Sept. 13, with 6,506, and dealings in gas shares were reduced on previous weeks, averaging 35 per day.

The week's price changes were as follows:

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Alliance & Dublin, cons. ord.	21/6	23/6	+ 2/
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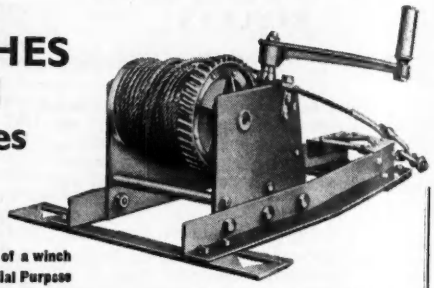

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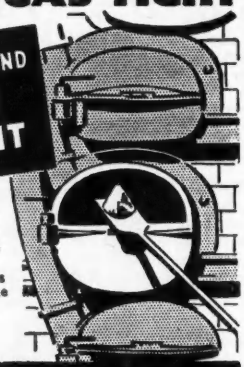

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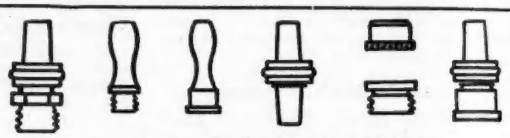

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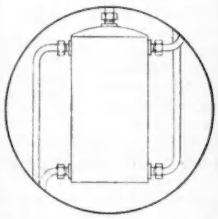

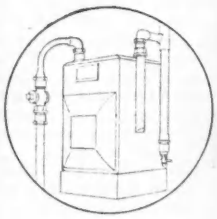

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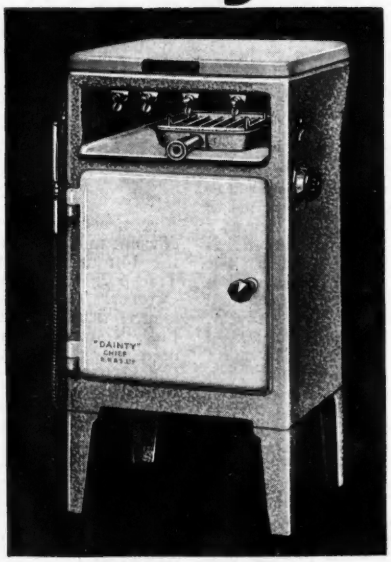

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